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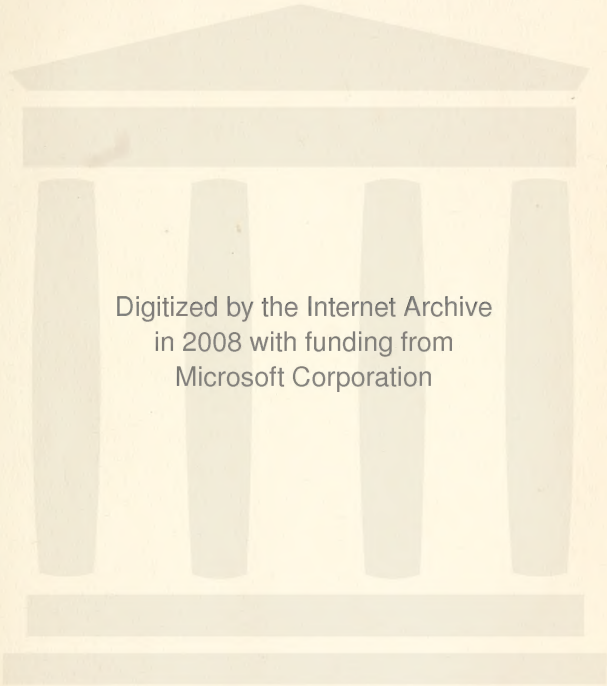
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Teachers College Record

Edited by DEAN JAMES E. RUSSELL

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ANNOUNCEMENT OF VOLUME VI—1905

The March number of the TEACHERS COLLEGE RECORD will deal with "School Hygiene," including questions of the proper nourishment of school children, the prevention of contagious diseases, and the like.

Other issues now in preparation will deal with "The Elementary School Curriculum," "Problems of Secondary Education," "Manual Training," and "Nature Study."

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TEACHERS COLLEGE RECORD

VOL. VI JANUARY, 1905 No. 1

EDUCATIONAL PSYCHOLOGY

Papers submitted to the Society of College Teachers of Education, Milwaukee Meeting, February 28 to March 2, 1905

THE COLLEGE COURSE IN THE PSYCHOLOGY OF EDUCATION; ITS AIM, METHOD, AND SUBJECT-MATTER

By A. CASWELL ELLIS, Associate Professor of Education,
The University of Texas

The informal discussion of "The College Course in the Psychology of Education" at the last meeting of the *Society of College Teachers of Education* centered around the following questions, which I understand the new committee is now asked to discuss in several papers that are to serve as the basis for fuller discussion at the next meeting:

I. Shall the course in the psychology of education aim to: (a) make applications of the facts and principles of psychology to education; or, (b) "interpret the conditions in education by means of certain psychological conceptions"; or, (c) derive educational theory and practice through genetic psychology; or, (d) help students to develop a point of view?

II. What methods shall be employed in teaching this subject?

III. What definite subject-matter is there which may be given in a course on the psychology of education?

IV. What relation shall the course in the psychology of education bear to: (a) the course in general psychology (shall

general psychology be required as a prerequisite?); (b) the course in methods; (c) the course in practice teaching?

V. Are the conditions such that this Society can settle upon a standard of time to be given to this subject?

VI. What shall be the character of advanced courses in the psychology of education?

The Aim.—As there is no intelligent basis for the selection of subject-matter or consideration of method until the aim, or aims, of the study have been determined, this demands attention first. It seems plain that no one of the four aims proposed in the first question is adequate. The course which aims merely at applying the known facts and principles of psychology to education must be a very thin course, for the "known facts and principles of psychology" are not numerous and those having application to education are few indeed. Furthermore, these facts and principles will not come up labeled when our pedagogy graduate gets out into the schoolroom and finds himself dealing with minds which flash out every minute a whole catalogue of tangled-up psychic facts and principles which must be carefully observed, discriminated, and classified before a poor teacher can tell which of his principles he is to apply just here. The second aim offered, if I understand what the terms used mean, seems to me still less adequate. Surely our graduates should know more psychology than can be discovered by searching out the psychological basis of the present educational practices. If well done this would surely lead to a mighty rattling among the dry bones and to the elimination of much of our present educational practice, but whence would come the knowledge and power to devise better? Our course in the psychology of education should certainly give this knowledge and develop this power. That the third aim is also too narrow, or one for which we are hardly yet ready, will, I am sure, be apparent to those of us who have tried to find material for a course in genetic psychology that would not be devoted principally to the statement and criticism of methods of genetic study, to the records of experiments which blasted fond hopes, and to others which ended nowhere or which established by questionable scientific methods the perfectly obvious. With regard to the fourth aim proposed, I would say that the courses in our medical schools, in our law schools, and our military and naval schools would be considered

sadly inadequate did they do nothing more than give a "correct point of view," and I see no reason why our courses in education should be satisfied with such an aim.

All attempts to reduce the aims of the course in the psychology of education to one aim seem to me futile. The ends to be aimed at in the course in the psychology of education seem to me to be: to get students to look upon the mind as something which always works according to definite laws; to stimulate an absorbing interest in trying to discover these laws; to give such practice in observing and interpreting mental phenomena that the graduate will daily practice accurate observation and rational interpretation when he goes into the schoolroom; to give those known facts and principles of psychology which have bearing in education and to point out this bearing through criticism (in the broad sense) of present educational practice and through practical attempts to apply these principles and facts of psychology in actual teaching under skilled supervision.

It seems a waste of time likewise to try to decide which of these aims is primary and which are subordinate. The teacher equipped with a knowledge of the facts and principles of psychology, but without training in the careful observation and rational interpretation of mental phenomena, would be as liable to err as the engineer who knew all the formulæ of mathematics and physics and mechanics, but had not been trained to set his transit level or read his scales aright. Again, the one who has a correct point of view and habit of observation and interpretation, but has not been taught the facts and principles of psychology, is as helpless as the engineer who can set his instrument and read his scales aright, but must invent all his working formulæ and tables as he goes. The student who has both the knowledge of psychology and the capacity for observation will put neither into practice if the course has not been so taught as to awaken a fondness for doing this work.

These aims, to be sure, are not necessarily in the least conflicting. In the process of acquiring the knowledge, if the course is properly taught, correct habits of observation and interpretation, the recognition of the lawfulness of mental life, and the love of searching for its laws should be gained as well. Unfortunately it is not usually so taught.

I wish to say here, by way of parenthesis, that my experience in teaching this course and my observation of other professors lead me to the belief that we need to be more on our guard that we do not fail in developing both a love for psychologizing and the power to do it accurately and rationally. Knowledge without these is vain. If these are present, knowledge may afterwards be added unto them. In our mad effort to cover the knowledge of the subject, the students are rushed along at such a rate that no time is given to gain skill through practice in personal observation and interpretation. Indeed, we often teach even the methods of gaining psychological knowledge as if these were just so many more facts to be remembered, not experiences to be undergone, and formulæ through the practice of which under our skilled supervision the students are to acquire skill. This skill is essential for the intelligent application in the schoolroom of the known facts of psychology, as well as for the discovery of new facts and the invention of new methods. I see no reason why our future leaders in this branch of applied psychology should simply sit and wait for the crumbs of educational psychology which fall by chance from the philosophical psychologist's table, as has been done in the past. The courses in the psychology of education should share with the philosophical and biological courses in educating teachers who are able to advance our knowledge of those phases of psychology which will have a bearing in education.

Method.—In the matter of method, there is first the question as to the general manner of approach of the entire subject, and after this numerous details connected with the manner of teaching various parts of the subject-matter, and accomplishing the several ends aimed at in the course.

First, shall this practical study of mental life be made through a study of the activities of isolated elements, such as memory imagination, sensation, emotion, will, with the hope that we can correct the distorted view of mental life which this causes by calling attention later to the fact that these isolated activities are really convenient fictions, things which, as a matter of fact, never exist, but which are used in teaching psychology to simplify the material to be handled? Shall we save our students, in short, from the pit we dig, by calling attention to the unity of mental life all the while we are analyzing and studying the

disjecta membra ? Or, second, shall we study mental life only as a whole, studying it as a whole through the behavior of the child in relation to its environment as it grows and reacts as a whole to various situations; study the causes leading to certain characteristic activities and characteristic features of growth, the relations of successive phases of development to each other —both immediately and remotely successive—and so on, and so on?

Both of these general methods of approach have their advantages and disadvantages. The latter method is undoubtedly the more natural and, if the feet of the professor retain their contact with the earth, is less liable to mislead the student and befog his natural common sense by a set of false divisions of the mind and a confusing terminology and classification, which ought soon to be as obsolete in psychology as are pre-Darwinian classifications in botany and zoölogy. Yet he who attempts a course on this plan will find himself painfully short of material which his class can use, since nearly all the work even in genetic psychology has been done from the old psychology standpoint by men soaked in the older views, and is so reported that it is well-nigh impossible to interpret the data from the standpoint of a truly genetic and functional psychology.

He who follows the first method, on the other hand, has much interesting material to present to his class, but he will inevitably coast perilously near the maelstrom of faculty psychology, and will find it difficult to keep his students from thinking of the mind as a congeries of activities, such as memory, perception, emotion, conception, attention, will, one of which performs for itself a while according to its own laws and then goes into a far country, while first one and then another of the others comes forth and takes its exercise. These students finish the course with an awe-inspiring ability to define such acts as memory, imagination, will, and the like, and can tell all the laws governing each; but what happens when all these powers get to work at once, as they do in real life, is a question they are not well prepared to meet. Furthermore, nearly all the facts and principles of general psychology in our text-books, written to fit this plan of teaching, are those facts discovered by introspection of adults, or by experimentation and observation made upon adults. Our students who become teachers will,

however, have to deal chiefly with children. This text-book psychology giving the laws governing the several dissected mental elements which have been derived from the study of adults will give little insight into those changing phases of mental development through which the minds of children are constantly passing in the growth from ignorance and incapacity to knowledge and mental power. For example, where will your student of this course learn any of the following: at what period is memory for crude facts best; when is the altruistic impulse strongest; when does power for abstract and rational thinking begin to show itself most strongly; at what periods, or in what order, do the various mental powers ripen ready for stimulation and cultivation; what are the periods of peculiar mental stress, weakness, and danger—as, for instance, the time of danger from scepticism, or morbid religiosity, or perverted sexuality, or certain tendencies to cruelty, to dishonesty, and the like; what are the developmental relations between the different characteristic periods of mental development—as, for instance, between early sentimental love of nature and the later cold-blooded, scientific, purely rational attitude of mind; between the early superstitious anthropomorphism and later higher spirituality; between the lawless use of the imagination in fairy tale or folklore, and the later interest in real life and ability to abide strictly by the facts; and so on, and so on? In all of these lines, and on all similar highly important questions, our text-book psychology of education and the method of studying solely the *disjecta membra* of the adult mind are footless and must ever remain so.

If each of these methods alone is so inadequate or misleading, the question arises at once whether we do not need to employ both, hoping that the accumulated psychological knowledge of the race gained by the old method of study will serve to fill out the deficiencies in the results obtained by the newer method, and that the study by the newer method may, on the other hand, serve to correct the misconceptions well-nigh inevitable in the use of the older method. This seems the rational conclusion in the present state of development of the science of psychology.

If study must be made by both of these general methods, we have now to determine which shall be employed first. If we possessed more connected, complete and reliable subject-matter

for the course from the genetic and functional standpoint, this would seem the natural approach, but this we have not yet obtained, nor are we in possession of any but the crudest methods of teaching what is known. Furthermore, this would make it necessary for us to begin our course in the psychology of education with a study of the mental activity of children, since practically all study of the mental life of adults has been done by the older method of analysis and study of the *disjecta membra*. To begin the study of the psychology of education with a study of child psychology would in our opinion be a mistake. While it is, after all, a knowledge of the minds of children which the teacher most of all needs, and while a large part of modern pedagogical nonsense has arisen from the stupid application to school children of facts of psychology gotten through the introspection of adults, it still seems imperative that we begin the study of educational psychology with the introspective study of the activity of the adult mind. This arises out of the simple psychological law that the human mind can proceed to the unknown only through the known. The student of the psychology of childhood must develop some sort of apperceptive organ for the observation and interpretation of the mental phenomena of childhood before he can profitably undertake such study. The adult mind is nearer to the student than is the child mind. The student has a mental life going on within him, through the observation of which the abstract discussions of the text and the professor can be given concreteness and can be understood. All facts of psychology must ultimately get their meaning through introspection and comparison with the only mental life of which we have any immediate experience; *i. e.*, our own. If the student has not cleared up his hazy notions of his own daily mental activity, and gotten practice in the handling of non-physical phenomena, I cannot see how he can study intelligently the mental phenomena of childhood, of which he has, to serve as apperceptive material, only dim and most unreliable memories. Having once obtained facility in observation, in analysis, in the general handling and interpretation of the facts of his own present mental life, he is then better prepared to call up, sift and handle the memories of his own childhood, and through these to work out to the study of the facts of child psychology in general.

We would conclude then that the study should begin with the study of the adult mind, and perforce with study of the results obtained by the old method, since practically no studies of the adult mind have been made by the newer method. However, let us not forget that this is merely the place to begin. To stop here would be disastrous. It seems hardly necessary to add that this order of procedure does not mean that we must first teach all that is known of the psychology of adults as far as it applies to education and then proceed to teach what is known of child psychology. Even in the study of a single topic, such as instinct, as given in an ordinary text on psychology, it is often necessary, after getting all possible light from introspection, to go back to the facts of childhood or even of animal life, and forward to the phenomena of mental decay, in order to gain clear insight. In each case, however, introspection must precede. And finally, after all such studies of fragments of the mind are made as best they may be, we should close the course with such a consideration of mental life as will reawaken and instruct the sane common sense of the student by a study of the operations of the mind as a whole (especially the child mind) as it reacts to this and that natural or artificial stimulus in life —stimuli from within, and stimuli from without.

In brief, then, we would begin our first year's course in the psychology of education with introspection and analysis, and would, not from choice but for the reasons given above, take a survey of those facts and principles of psychology bearing on education which have been obtained by the study of the dismembered parts of the mind, starting always from the study of the student's own adult mental life and working out where possible to children's mental life. As a corrective for the utter inadequacy of such a course, and for misconceptions of mental life almost sure to result from this kind of study, we would follow this for one term by a study of the mind as a whole, watching its growth and reactions to the varied stimuli of life.

With the aims and general method of approach determined, there remain for consideration the detailed methods to be employed from day to day in accomplishing these aims. As the success of any particular method is so largely dependent upon the personality of the teacher, I feel great hesitancy in saying anything on this point. I can only say that I personally seem

to have accomplished most when pursuing the following plan. Each student is required to use some text in preparing for recitation. The recitation hour is largely devoted to free and easy Socratic discussion, with a view to helping the students to introspect, to clear up for themselves their own thinking, and to discover for themselves either what are the psychological problems involved in certain educational practices or to find the bearing in education of the facts of psychology given in the text or in my class lectures. The hour is never dawdled away in an oral quiz on the text, nor are the students given hour-long lectures by the professor. The lectures would play a much smaller part than they do but for the absence of any text which contains anything like a complete collection of those facts and principles of psychology which have bearing upon the problems of education. At times, points are left at a stage of confusion to which I have purposely brought them by the discussion, and the students are required to complete the thinking and hand in the result as a written exercise at the next recitation. The students are also often required, after learning a new fact or principle of psychology in class, to write for the next lesson a paper stating the possible applications of this fact or principle in teaching, and giving concrete instances of its violation and of its application in the actual teaching which has come under their notice during the two days intervening.[1]

The absence of a practice school here prevents our requiring students to actually prepare and attempt to teach lessons in accordance with the psychological principles under discussion at the time. This is, in my opinion, the place for correlation of the practice course with the psychology of education course.

During the fall term we require, in addition to the three recitations, one two-hour period of laboratory work per week. Notwithstanding the fact that my friends among the experi-

[1] I may add here that it was through these reports that I learned of the well-nigh universal misconceptions which arise from a study of separate mental powers. The student becomes so anxious not to have violated some principle of memory or association, for instance, that he will criticise an act of a teacher which may have been an excellent process for developing reasoning power or awakening an interest—this being the purpose of the teacher at the time. Or the student's infatuation for the law of neural habit may blind him utterly to the baldest facts of instinct or of will, which are operating all at the same time.

mental psychologists will hold up their hands in horror at a twelve-period course in laboratory work, experience convinces me that it clears up far more obscurities and misconceptions than it causes and, if properly given, is a very valuable part of the course. The students accomplish the following things:

1. By dissection of a sheep's brain and by study of models, charts, sections, photographs, and lantern slides, a general notion is obtained of the gross anatomy of the brain and of the microscopic elements; also some idea of how impulses are conducted, how reflexes operate, and of the probable physical accompaniment of mental operations.

2. One sense organ is studied as a type.

3. The meanings of such terms as subliminal, threshold, specific energy, after-image, relativity of sensation, are learned by actual experience.

4. The process of perception is carefully analyzed by experiments with illusions.

5. The actual use of the plethysmograph and chronoscope is observed, and in some cases learned.

The plethysmograph is used to impress upon the students the intimate relation between mind and body. The study of illusions and of reaction times is used to help them realize that mental life may at least in some phases be studied by definite and accurate experimental methods. I have been especially anxious to supplement this by certain experimental work in memory, in attention, and in emotion, paralleling the discussion of these topics in class, but the limited time at the students' disposal prevents this.

During the winter term the laboratory work is dropped and each student is required to undertake privately a piece of individual study in the psychology of education. The student selects his own topic (topics are suggested from day to day in class discussion), and with the aid of the professor finds literature on it. After reading widely for two months he presents the results of the reading in an essay. This plan at least enables the students to get a great deal of work out of the professor. It also gives the professor an excellent chance to find what is in a student and where he stands mentally. While a few dodge the work and fail, the vast majority do a surprising amount of reading and, in their compilation and criticism, exercise more

thought than would be required to pass quizzes on an extra text-book. Many students consult repeatedly with the professor about this work; each must consult with him twice, once to get suggestions about literature and the general plan of study, and once after full reading to present for consideration the outline of the plan upon which he proposes to write his essay. That the object of this is to teach the student to lean upon himself, and to teach him how to use literature in the study of other psychological topics, is too obvious to need mention. That it accomplishes this more often than it can be accomplished in any other way seems to me amply borne out in seven years' experience with this practice.

I wish to again state that not the dimmest thought is entertained that the devices above enumerated constitute the only correct, or even the best, method of teaching this work. Under the burden of very large classes and very numerous outside duties, and the handicap of limited library facilities and no practice school, it seems to be the best this particular teacher has been able to devise. (I understand that these articles which we write are to be in part a general confession of individual sins as well as a discussion of broad principles.) The most serious objection to this plan is that the individual conferences and the careful correction of the numerous papers handed in involve an immense amount of work on the part of the instructor. Not to correct and return the papers and not to discuss general types of error and of excellence in class afterward is to destroy the value of the method. To put this work off entirely on student-assistants and fellows is likewise to prevent the possibility of accomplishing that which is one of the chief aims of such work; *i. e.*, to find out for yourself just where your students are in their mental progress. Furthermore, I find that not one assistant in three does this work well, and I may add that the assistants here are about as capable a set as I have met anywhere. It is also objected that this method requires too much work of the student, who is supposed to devote only nine hours a week to a course, including lecture and laboratory periods. During the first year that this method was pursued there was much complaint of overwork—the professor was even waited on by the Dean of Women in behalf of the burdened girls. There has been little or no complaint, however, since the instructor became a little more familiar with the

course himself and since the students have gotten over the notion that the study of the psychology of education means the memorizing of a set of beautiful ready-made universally applicable principles of teaching which, after being memorized, can be applied like Munyon's specifics by anybody and in any kind of situation.

It seems hardly worth while to discuss the methods of teaching the last third of this course, which deals with mental life as a whole, since the method must vary according to the size of the class, the library facilities at hand, and the particular topics thought worthy of study. These topics constantly change as newer and better studies appear. The statement about subject-matter, made later, will indicate the general method.

Subject-Matter.—An effort is first made to give an intelligible statement of the different ways in which psychology has been studied. The introspective, the physiological, the abnormal, the animal, and the child psychology each receives brief notice, and the peculiar advantages and the limitations of each field and each method are illustrated in one or more concrete instances: for example, the use of introspection in the study of perception —its limitations in the study of emotions and of the relation between mind and body; the light thrown on the personality, the memory, and the emotions by abnormal psychology; the clearer views in instinct coming from the study of animal psychology; the new knowledge of the nature of mental growth gained from child psychology.

After this introduction a concrete piece of mental life in the shape of a revery is put before the class, with the request that they discover why the mind kept moving and why it moved in the particular order in which it did. All of the so-called laws of association are invariably quickly found by the class. It is frequently not so easy to show that all the associations are due to the working of the one simple law that "when two or more ideas have been in mind together, upon the recurrence of one of them the other, or others, tend to come with it." The class next looks for the determining factors which cause one rather than another of possible associations to rise at a particular time. This brings us to memory, which is then analyzed and a rational basis gained for judging the validity of methods of study which may develop or injure it. The following questions

are of interest here, and upon each we have definite results from careful experimentation: How may memory be improved? Does increased power of memory gained in one field of work give increase in all fields? Is memory a faculty? Should similar sets of memories be acquired at the same time, or one set first thoroughly mastered before the other is begun? What is the best plan for memorizing disconnected facts; logically related facts? At what period of development is memory best for disconnected facts; for logically connected material? How much is memory aided by presentation through several senses instead of one?

The study of memory drags in imagination, the analysis of which carries us into perception. Introspection is practised by the class here and soon makes manifest the wide differences in types of images habitually used by different people. Appeal is made to abnormal psychology to settle the question of the creative (*ex nihilo*) power of the imagination. In discussing the training of the imagination and its relation to other powers we pass into perception. Here the analysis of an act of perception takes us back, on the one hand, through association, memory, and imagination, and leads, on the other hand, into sensation. An example in the study of perception affords the best opportunity for illustrating the greater accuracy and clearness which the laboratory experiment makes possible. Most students will when asked, for instance, why they perceive you as standing at the board, state that they perceive you there because you are there—intimating in general that things are perceived as such because they are such. Now rotate before the class a disk with a spiral drawn upon it and stop the disk suddenly. When they then see the spiral apparently go in the opposite direction while the disk is motionless, they must admit that we do not see a thing as such merely because it is such, for a motionless thing is perceived here as if in motion. Then what makes us perceive things as we do? Rotate now a disk painted so as to produce alternate rings of gray and blue. At once they see that the gray becomes yellowish. Rotate the same gray ring with surroundings in turn of green, of red, of yellow; each time the color of the gray will seem different. In this way will be discovered one thing which modifies our perceptions, namely, the surrounding objects. In the same definite concrete way the

influence of the immediately preceding perception can be shown, and then the fact that ideas received years ago often join with present sensations in creating the perception of a very simple thing. Here we have apperception already explained, and the time used in the experimental demonstrations well spent in illustrating one important method of psychological study and in impressing upon the students the truth of perception in a way which they do not so soon forget as they do mere words.

The study of perception brings in the new element of sensation, which now demands study. Here there is comparatively little of value for teachers. The creative nature of the sense process is made manifest. The fact is pointed out that our organism is capable of responding to very few of the myriad vibrations which probably surround us. The selective nature of our physiological mechanism and of our consciousness is brought out, and the laws of sensation are experimentally demonstrated—the law of the threshold, that of subliminal stimuli and summation of stimuli, of specific energy of nerves, of relativity and fusion of sensations. After this general survey the sense of sight is treated somewhat fully as a type.

This study of sensations and sense organs leads inevitably, if the students have any life at all, into questions about the structure of the brain. With the aid of slides and microscopes, models, and charts, a teacher can in two or three two-hour periods give all that the average student needs in order to understand the reflex and volitional mechanism, and to get some idea of the physical basis of association, memory, and the like. This is followed by a lesson on localization of function in the brain, and the study of so much of the gross anatomy as can be gotten by the dissection of a sheep's brain during two periods of laboratory work.

Just what is best to take up next has often puzzled me, but generally I find that the study of localization leads into discussion of nervous functioning in general. The inherited unlearned reactions are mentioned here, though not fully treated till instinct is studied. The three methods which the organism has of acquiring new reactions should certainly be impressed upon the students; namely, first, by the selection and repetition of chance successful reactions; second, by imitation; third, by volitional response to an idea. It is very important that the

young teacher appreciate fully how very differently different things must be acquired by children.

General nervous function leads into a study of the physiology of habit, which in turn brings up the psychology of habit. Here the teacher has interest in several practical questions which psychology can settle. What is the easiest method of establishing a new habit? How best break an old one? When should processes be reduced to habit and when not? What is the effect of habit upon the will and character (here brief study of reformatory methods and criminal psychology is helpful)? What are the usual and most probable habits both good and bad to be expected, or to be established, or to be broken, at different ages?

This last question leads into a study of instinct. Here is a field the importance of which for education is just beginning to be appreciated. I have found no other subject more interesting to my classes, and certainly no chapter in psychology has more profound bearing upon education. Animal and child psychology have here worked a revolution. The earnest student wants to know about many things in this field. How did instincts originate? What is the relation of instinct to intelligence? Does man have instincts? What are these instinctive tendencies in man? At what age is each of his instincts, good or bad, most likely to crop out? What conditions favor and what repress each? Which of these instinctive tendencies are necessarily transitory? Which may become fixed? What fixes an instinct? What stimulates it? What checks it? Which of the early instincts prepare the way for later good instincts or hold down bad ones? Which of the later instincts check off early bad ones? and so on indefinitely.

Instincts involve emotions, and the student now wants to know the causes which produce emotions. This is one chapter of psychology in which a comparison by the class of the views of several authors seems to me to be valuable. First, the general view that emotions result from ideas; second, James's claim that they result from bodily conditions; third, Herbart's theory that they result solely from the conflict or harmony of the ideas in mind. Each of these has something of truth, and, when properly understood, some suggestions for education. The usual cataloguing and describing of emotions is useless for

teachers, but one of the emotions deserves especial study, *i. e.*, the emotion of *interest*. What are children's natural interests at different ages? What purpose in life does each of these serve? How is a new interest aroused, how checked? What is the effect upon the character of studying always along lines of interest, and the effect of the opposite process of ignoring or crushing interests? These are a few of the questions in this line which psychology can and should answer.

An appreciation of the enormity of my offense in making this paper so lengthy leads me to omit all further details and say that in the study of imitation and suggestion, of attention, of discrimination, conception, reason, personality, and will, there is ample material to fill out a course in the psychology of education, every part of which makes clear the right or wrong of certain educational practices.

The writer has not found it possible as yet to give a closely knit and logically developed course in genetic psychology, viewing in an orderly way the growth and activity of the mind as a whole, since the studies yet made have yielded only a few definite results of value, and since these studies have been made here and there without any coördination or definite plan. Notwithstanding this, there are so many helpful and hopeful suggestions for teachers in these scattering studies that they are well worthy of the student's attention both because of the subject-matter contained and because of the value of this kind of study as a corrective for the two terms of old line psychology.

We believe that this part of the course begins best with a study of the laws of growth, starting with bodily growth and working through a study of the growth of the nervous system up to the study of mental growth. Consideration is given to such topics as the following: the periodicity of growth; the inner and outer factors in growth and their relative effect; development from fundamental to accessory; Jackson's three-level theory of nervous development; vestigial organs; nascent periods; retardation periods; the relation of special to general development; an outline of characteristic features of infancy, childhood, pubescence and adolescence; the developmental (non-mathematical) relation between different phases of growth. In each topic the known facts on the physical side are given, after which the principle found to govern here is tested in the

light of the known facts of corresponding processes in mental life.

The general character of the subject-matter can be seen by consulting such works as Donaldson's *Growth of the Brain*, Burk's articles entitled *Growth* and *From Fundamental to Accessory in the Development of the Nervous System*, the articles of Bryan and Harter on *Learning the Telegraphic Language*, several of Thorndike's books and papers, numerous papers by Dr. Hall and his students, including my own article entitled *The Philosophy of Education*.

This study of growth should be followed by a study of the laws governing fatigue and arrest of development. This important part of the course is with me at present in a sad way because my own studies of fatigue have convinced me that all of our methods of studying fatigue are so inaccurate as to make the results to date either worthless or misleading. We are also in great need of more and better studies of the symptoms and causes of arrest of development.

These general studies serve to give the student the right point of view and right attitude of mind towards the mental growth and development of children. After this is gained, the remainder of the term is spent in studying the results of the investigations which have been made of special groups of reactions, or tendencies to react. Students have shown much intelligent interest in the following topics, and there is enough reliable subject-matter available on each to make the study worthy of serious consideration. Imitation and suggestion; play tendencies, their relation to serious activities and to general development; the development of reactions towards language and literature, towards nature, towards art, towards social life, towards restraint, authority and law, towards moral considerations, towards religious beliefs and ceremonies. It hardly need be said that all of these and all of the above-mentioned general topics cannot be treated in one term. Just what to omit is each year a difficult question which is usually settled on purely practical and local considerations, and hence need not be mentioned here.

This course should include (preferably somewhere near the end) a study of the limitations, the inaccuracies, and the real value of each of the methods now employed in the study of the

mental development of children. The individual studies of Darwin, Preyer, Shinn, Baldwin, and others; the practical method of Warner; the loose questionnaire method of Hall, Sully, and others, aimed primarily at qualitative results; and the rigid mathematico-statistical method of Galton, Thorndike, and others has each peculiar value which should be pointed out. The same is true of the approaches made by Donaldson, Loeb, and others from the neurological side; by Oppenheim from the medical side; by Chamberlain from the side of Anthropology; by Seguin, Howe, Clouston, Kraepelin, and others from their special fields. This part of the course should make it possible for the student who completes it to evaluate properly the results which have been attained by these different methods of study, and possibly in time to originate better methods. If not so much as this can be accomplished, then at least it should enable the next generation of developmental psychologists to escape the more virulent form of the questionnaire epidemic without lapsing into questionnairephobia or mathematico-statistico-mania.

The Relation of the Course in the Psychology of Education to other Courses.—(a) My experience and my information gained through inquiry lead me to believe that a course in philosophical psychology should not be made a prerequisite for educational psychology. The problems discussed and the methods used in teaching are so different in the two courses that the one is not only not necessary as a prerequisite for the other, but is of little more special use for this purpose than a course in general biology. In fact, I am of the opinion that the more practical educational psychology is the best possible introduction to the subject of psychology and almost a prerequisite to the intelligent study of philosophical psychology as now universally taught.

(b) When our courses in the psychology of education are what they should be, I hardly see what there is left to give in a course in general method. All special method courses should have the psychology as a prerequisite.

(c) This is answered on page 9.

Advanced Courses in the Psychology of Education.—The advanced work in the psychology of education should be granted only to those who, after completing the preliminary course, have pursued seriously courses in general psychology, philosophy, and biology in such a way as to equip themselves for investigation.

For such students there is a most attractive field of work, either in the further study and investigation of the psychological processes involved in the old and in newly devised educational practices, or in the investigation of those problems in psychology the solution of which will throw further light upon the processes of teaching and of education in general.

WHAT INSTRUCTION IN EDUCATIONAL PSYCHOLOGY SHOULD BE GIVEN IN A PROFESSIONAL COURSE FOR TEACHERS?

By EDWARD L. THORNDIKE, Professor of Educational Psychology, Teachers College

Sooner or later we shall learn what training is desirable for teachers by experimenting with various courses and keeping track of the results. Our present hit-or-miss methods of following individual opinions or traditional practices will give way to the rational selection of the proved best. But at present we can only decide what is likely to be best on general principles.

These advise us to give an accurate, scientific course, such as would be acceptable to experts in psychology; one that will also train students to interpret the facts of school life logically and scientifically; and, in the third place, one that will give the greatest possible amount of information of direct value in increasing the teacher's efficiency. These three aims would, of course, be so adjusted in case of conflicts between them as to maintain a wise balance.

The success of a course in educational psychology depends to a large extent upon the course in general psychology which precedes or accompanies it. This is too often only an elaborate series of descriptions and arbitrary definitions plus much or little inaccurate brain anatomy, descriptions of child life, or amateurish philosophy. The respectable general courses fall into three groups: those demanding analytic and reflective study as a propædeutic to future courses in philosophy; those rich in the empirical psychology of sensations and the percepts; those attempting to describe and explain mental life in general. Courses of the first sort unfortunately emphasize just those methods of study, and courses of the second sort those data, which the prospective teacher does *not* need. The second sort are preferable because they at least do not weaken the sense of fact. Courses of the third type, though the best now available, are hard to administer. The topics are too many; useful experiments have not been devised; definite exercises for students such as we have in books on algebra or physics are lacking; there is little unity apparent in the science; for instance, what

the student learns about the brain he rarely hears of afterward. The books of this sort remind one of the older geographies, in which we first learned all about the New England States, then all about New York, and so on, no apprehension of any general geographical laws ever resulting.

It would appear wise in adapting a general course to the needs of teachers to give much less attention to the gross anatomy of the nervous system, including the organs of sense, to the processes involved in the perception of the external world, and to the psychology of any special feelings, such as of self. These three topics take up much of the student's time with little profit. The gross anatomy of the brain has little meaning except for the surgeon; sensation and perception are much less important to the teacher than habit, the association of ideas, or the process of discrimination by varying concomitants; the elaborate description of our feelings of self, time, recollection, rhythm, distance, and a dozen other special feelings, are all together much less important to the teacher than a few plain facts about individual differences.

Much more attention should be given to dynamic psychology than the present custom allows. At least one third and perhaps one half of the general course should deal with the connections between outside events and mental states, between outside events and acts, between one mental state and another, and between mental states and acts. Instincts and capacities, habits, the share of previous experience in perception, the association of ideas, the abstraction of elements, ideo-motor action, and inhibition should be leading topics in a psychology for teachers.

Students who have thus learned the elements of psychology could take profitably any one of several distinct lines of work, each of which could be and has been called educational psychology.

(1) A course fashioned after the old applied psychologies, but possessed of truer facts, is a useful one. What Bain did in his *Science of Education* with the psychology of his day, we may do in an Educational or Applied Psychology with our increased knowledge and from our new points of view.

(2) A course of more detailed study of special topics, such as attention, types of imagery, the association of ideas, induc-

tive and deductive reasoning, the psychology of reading, fatigue, the influence of the bodily expression of mental states and the like, is also a useful one.

(3) A course in the psychology of childhood with special attention to the behavior of children as learners and to the relation between their behavior and general psychological laws may often be as helpful as either the first or the second course.

The writer's own belief and practice is in favor of (4) a course somewhat evenly divided between (a) the psychological basis of general educational theory, (b) the psychological basis of teaching in the narrow sense, and (c) the special psychology of childhood and adolescence. The topics under (a) may be: the share of original nature in determining intellect and character, the influence of the environment in originating and selecting mental variations, the influence of special training on general abilities. The topics under (b) may be: teaching as the art of providing stimuli to desirable reactions; the conditions favoring the reception of stimuli; their control; means of securing attention, memory, comprehension, and appreciation; fruitful inductions and deductions; the value of analysis, comparison, expression, application, and correlation; the conditions requisite to habit formation; suggestion and imitation; incentives and deterrents; the control of the emotions; mental hygiene. The topics under (c) may be chosen from a wide range, but with regard to the fact that, other things being equal, the facts of later childhood and adolescence will be worth more to the teacher than those of infancy.

Any one of these courses can be made to fulfill the three aims suggested in the second paragraph of this article. The first would probably be the hardest to make satisfactory to the scientific psychologist; the second would provide least direct practical information to the teacher; the third would run the risk of giving too little training in applying psychology to teaching and of being unscientific; the fourth has the advantages and the disadvantages of a wide range.

In the administration of any course we are hampered by the lack of adequate text-books. I confess to having read but few of the applied psychologies and books on general method. They are too irritating to the sense of fact and of logic. So far as I know them, they are either weak dilutions of Bain flavored with

misunderstood doctrines from modern psychology, or one-sided applications of an unreal logic. At Teachers College we let the student make his own applied psychology, guiding him by a set of questions and suggestions.[1] The authoritative book will sometime come.

The literature dealing with the special psychological topics which may properly make up an advanced course for teachers is scattered, not very teachable, and either too hard or too inaccurate. The literature of child study has improved greatly within recent years, and by selecting wisely from three or four text-books, material fit for systematic study is now obtainable. All such books (including my own *Notes on Child Study*) are lacking in scientific rigor and are not sufficiently systematic. Suitable books on the psychological basis of general educational theory are the hardest of all to find. The educational theorists are hopelessly vague; the accurate knowledge of the topics is stored up in books or memoirs which are far too difficult for our students. The instructor is forced to organize the material himself and to lecture.

In presenting the subject-matter for any one of these four courses our besetting sin is vagueness. "You must be clear to gain attention," we teach, but, *just how* to be clear is what the student needs to know. "The teacher must fit the stimuli he presents to the individual differences of his class," but *just what amount* of individual differences to expect in a class or *just how* the same lesson is to be modified so as to profit the dull and the bright, the abstract and the concrete thinkers, is the main practical problem. It is no great insight to learn that heredity plays a great part in mental achievement: just in what directions and in what amount, are the questions the answers to which will modify our educational practices. We need to feel an utter abhorrence of vague recommendations which mean so much that they mean nothing, and to search the four quarters of psychology for definite facts that give positive guidance in the actual situations of school life.

So much for the subject-matter of a course in educational psychology. Concerning the methods of teaching such a course, I have somewhat more decided opinions.

[1] See the syllabus of Education 3 printed in the Teachers College Record, September, 1901.

First: to take the student's time for hours to scribble down notes is well-nigh criminal. What a student is expected to learn should be given to him in a convenient form for study, namely, in print. That we waste his time and ours in lecturing is due either to the fact that we are too lazy to write out and print our lectures, or are ashamed of them, or are afraid that, deprived of our lectures, we should really have to teach the class.

Second: to assign tasks in required reading without having at least one copy of the book in question for every ten students in the class is cruelty.[1] The money spent in duplicates will be saved twenty times over in the time required to find and secure the books.

Third: definite exercises which force the student to test his knowledge and enable the instructor to distinguish between verbal and real knowledge are a prime necessity. Consider what our arithmetic and algebra books would be if they contained no examples; what the teaching of Latin would be if there were no Latin composition or translation; what instruction in rhetoric was before the days of theme writing! We have gotten on so long in psychology, economics, sociology, and the other mental sciences with only the presentation and discussion of principles that we fail to realize the essential inferiority of such teaching.

Fourth: there should be observational and experimental work enough to connect the principles taught with the realities of life and to establish the habit of actually examining mental facts and verifying psychological laws. These experiments should be so devised or chosen that they will involve a minimum of knowledge of apparatus and produce a maximum of knowledge of fact. They should be interpretable without ambiguity and by fairly easy inferences.

Fifth: the reading of reports on special topics by individual members of the class is in ninety per cent of undergraduate classes an unmitigated bore. The student who writes the report gains much, but this gain may all be conserved by (1) depositing his report in the library and requiring each student of the class to read a certain percentage of such reports and write a criticism of one or more of them; and (2) fifteen minutes' conference with

[1] Of course I leave out of question tasks which do not involve the probability of several students wishing to use the book at the same time.

the instructor in friendly discussion of the report. Report reading is now in great vogue in college classes, but I am sure that it is a fetich, a most unfortunate legacy of the seminar.

Sixth: by systematic encouragement of the natural tendency of students to coöperate in study the entire work of the course may be made more cheerful and easy.

There are other matters concerning method which I should like to have discussed by the Association, but they are probably not of sufficient interest or importance to most of us.

I have, finally, one or two practical suggestions. Perhaps teachers of educational psychology throughout the country would welcome an expression of opinion from experts concerning the fifty or more books on pure and applied psychology that are now used as text-books. A committee of this Association might well report upon the characteristics of books on pure psychology which are or might be used in courses preliminary to a course for teachers. The American Psychological Association would, I am sure, find a thoroughly capable committee who would be willing to report upon books on educational psychology from the point of view of the scientific expert. Such committees should not recommend specific books or a specific course, but should indicate the quality of each book in somewhat the manner of the report of the New England History Teachers Association upon text-books in history.

It might be wiser for a joint committee to report on both the utility and the scientific quality of both sorts of books, but it would be hard for so large a committee to work efficiently; the labor would be quadrupled; and the increase in authoritative advice would not be great. We can easily tell how usable a text-book on educational psychology is by using it, and we have no trouble in estimating the scientific value of a text-book on general psychology by the personality and position of its author.

Such reports could be published without expense in the proper educational and psychological journals, and reprints could be distributed to all teachers of psychology in colleges and normal schools at a cost not to exceed thirty dollars.

OUTLINE OF A YEAR'S COURSE IN GENERAL AND EDUCATIONAL PSYCHOLOGY

The course at Teachers College represents one fifth of a student's work during the year. The course is carried on in three periods a week, plus one period for special assistance, consultation, and the like, which is voluntary on the part of the student. Two periods are spent in sectional meetings, the class being divided into as many sections as the necessities of economy will allow. These meetings are given up to rather free discussion, to questioning of the instructor by students and of students by the instructor, and the like. In one meeting the entire class comes together for lectures, demonstrations, announcements of work, and the like. The work of the entire course is divided approximately as follows: three sevenths of the time is given to a study of those aspects of general psychology which are most important for intending teachers and students of education; three sevenths to a study of the actual scientific knowledge possessed concerning the process of teaching, and the probable inferences to be drawn from psychology and child study concerning the problems of teaching and class management; one seventh to a study of the general relations between psychology and education, the psychological basis of general educational theory, and the application of scientific method to school problems. We try to so arrange the course that the student has always some definite work to do in addition to the mere reading of text-books and special articles. In general psychology, for instance, each student performs thirty simple experiments and solves some three hundred simple problems and exercises which test, apply, and to some extent increase the knowledge which he gains from books, demonstrations, and occasional lectures. Samples of these will be quoted later. In educational psychology the student himself makes the connection between the facts of science and the probably best means of procedure in the art of teaching by answering similar problems and doing similar exercises. Up to the present year the students have also done extensive observational work in the class-rooms of elementary and secondary schools. The size of our class, now over two hundred, and the exigencies of a program of studies so rich in electives that there is never a single hour

even of the week when the class as a total is free from other engagements, is compelling a reorganization of this work.

Outlines of courses are unsatisfactory unless they are so long as to give the actual details of the subject-matter of the course and the actual methods of conducting every aspect of the work. To do this is obviously impossible in this place, and I should not have made the outline which follows but for the fact that the officers of the association thought it desirable to have something more concrete for purposes of discussion than a general article. What we actually need for our practice, I am convinced, is not so much schematic outlines as a concrete fund of particular suggestions concerning experiments, observations, questions, and the like, and a wide variety of text-books on educational psychology from which the useful may be gradually selected for survival.

OUTLINE OF TOPICS IN GENERAL PSYCHOLOGY

I. The subject-matter and problems of psychology
   1. Introduction
   2. A general view of mental states
   3. A general view of human action
   4. A general view of the connections of mental facts

A.—*Descriptive Psychology*

II. Feelings of things and qualities as present: sensations and percepts
   5. The nature of sensations
   6. The classification of sensations
   7. Sensation and stimulus
   8. Percepts

III. Feelings of things as absent: images and memories
   9. Mental images
   10. Memories

IV. Feelings of facts: feelings of relationships, meanings, and judgments
   11. Feelings of relationships
   12. Feelings of meanings
   13. Judgments

V. Feelings of personal condition: emotions

14. The nature of the emotions
15. The classification of the emotions
16. The attributes of the emotions

VI. Mental states concerned in the direction of conduct: feelings of willing

17. Definitions and descriptions

VII. General characteristics of mental states

18. Qualities common to all mental states
19. Attention
20. A new classification of mental states

VIII. The functions of mental states

21. The function of mental life as a whole
22. The functions of different groups of mental states

B.—*The Physiological Basis of Mental Life: Physiological Psychology*

IX. The constitution of the nervous system

23. Gross structure
24. Finer structure

X. The action of the nervous system

25. The functions of the neurones
26. The arrangement of the neurones
27. The laws of brain action

XI. The nervous system and mental states

28. In general
29. The physiological correlates of particular groups of mental states

C.—*Dynamic Psychology*

30. Introduction

XII. Original tendencies to connections

31. Instincts
32. Capacities
33. Further attributes of original tendencies

XIII. The law of association

34. The growth of instincts into habits
35. The formation of connections in general
36. The control of the formation of connections
37. Response by analogy

XIV. The law of dissociation or analysis

38. The process of analysis
39. The influence of the law of analysis
40. The control of the process of analysis
41. Physiological conditions of human nature

XV. The connections between sense stimuli and mental states: connections of impression

42. Inborn and acquired connections of impression
43. The law of association in the case of connections of impression
44. The control of connections of impression

XVI. The connections between one mental state and another: purely mental connections

45. Associations of ideas
46. Memory
47. The control of purely mental connections

XVII. The connections between one mental state and another (continued)

48. Purposive thinking
49. Reasoning

XVIII. The connections between mental states and acts: connections of impression

50. The general laws of human action
51. The will. Spontaneous and purposive action
52. The nature of the mental states which precede movements
53. Suggestion and imitation
54. Individual differences in the life of action
55. The control of the life of action

XIX. Movements

56. Acts of skill
57. The connections between stimuli and movements
58. Movements as antecedents

XX. Selective processes

59. Attention and neglect
60. Satisfaction and discomfort
61. Conclusion

XXI. The relations of psychology

62. The science of psychology as a whole
63. The relations of psychology to other sciences
64. The relations of psychology to the arts

65. The relations of psychology to the personal conduct of life

The above topics are studied by the students through a text-book, certain required readings, and certain printed or mimeographed notes. The following may serve as samples of the questions, exercises, and experiments by which we try to preserve the student from vague and verbal notions, and to make his work outside the class-room as profitable as possible.

Exercises (to go with XII of the outline above)

1. Pugnacity, climbing, walking, emulation, jealousy, biting the finger nails, curiosity, and manipulation or constructiveness are commonly quoted cases of instinctive tendencies. What are the situations and the responses, the connections of which constitute these several instincts? *E. g.*, pugnacity means the response "blows" to the situation "being injured or interfered with," and the response "enjoyment" to the situation "fighting."

2. Of the instincts mentioned in question 1, name one that is delayed, one that is transitory, one that is common to man and the lower animals, one that is the most characteristic of the male sex, one that is most useful, one that is often the origin of criminal acts.

3. Give two illustrations from history or from your own acquaintance of a high degree of capacity coupled with only moderate attainments in other directions.

4. Just how would you get rid of the tendency in a child to torment animals? After writing your answer read again the last page of the reference and note which methods of those mentioned there your plan involves.

5. Which is rarer, the capacity to form percepts or the capacity to form abstract ideas?

6. Illustrate individual differences (a) in the case of sensation, and (b) in the case of imagery.

7. Illustrate race heredity, *i. e.*, the inheritance of certain mental qualities by a race as a whole.

Experiment 16. Instincts of the Reflex Type.—Have a friend hold about half or three quarters of an inch in front of his eyes, a piece of glass at least an eighth of an inch thick. Throw

directly at his eye a bit of cork or light wood, or a small wad of paper, so aimed that, but for the glass, it would hit the eye and at a fair rate of speed. Of course he winks. Then inform him that you will repeat the process, and that since it is impossible that anything can hit his eye he is to keep it wide open. Throw as before. Is the eye kept open? Repeat nine times more, noting and recording each time the action of the eyelids.

Experiment 17. The Modifiability of Instincts.—With sufficient time the instinctive closing of the eye can be modified and even inhibited. The experiment may take many trials. If it is made, a tube like a pea-shooter, but one half inch in diameter and not over eight inches long, and a sufficient number of bits of cork about a quarter of an inch in diameter, should be provided. Record the action of the eyelids at each trial, and continue the experiment until the person can hold the eyelids unmoved during ten successive trials.

Exercises (*to go with XV of the outline above*)

1. Read again the references on II and recall the results of the experiments there described. [These showed that the same sense stimulus was felt in different ways according to the previous experience of the perceiving mind.]

2. Illustrate individual differences in the capacities to feel things and qualities in response to sensory stimuli.

3. Illustrate individual differences in perception due to differences in previous experience.

4. Illustrate the law of diminishing returns in the case of the perception of movements. Of tastes.

5. Classify the following illusions as (*a*) those caused by the strength of previous habits and (*b*) those caused by the temporary set of the mind.

"An officer who superintended the exhuming of a coffin rendered necessary through a suspicion of crime declared that he already experienced the odor of decomposition, though it was afterwards found that the coffin was empty." (Quoted from Carpenter's *Mental Physiology* by J. Sully in *Illusions*, p. 108.)

"I never feel sure after wiping the blades of my skates, that they are perfectly dry, since they always seem more or less damp to my hand." (Sully.)

If we are seated in a railway train which is quite stationary, and watch through the window a train passing ours on a neighboring track, we feel our own train to be in motion in the opposite direction.

"I remember one night in Boston, whilst waiting for a 'Mount Auburn' car to bring me to Cambridge, reading most distinctly that name upon the signboard of a car on which (as I afterward learned) North Avenue was painted." (James.)

6. What are the connections of impression formed in learning to read?

7. What is really trained in the so-called "training of the senses"?

Experiment 18. Hold one hand in hot and the other in cold water for a few seconds, then immerse both in the same dish of tepid water. Compare the feelings of the two hands.

Experiment 19. Color Contrast.—Take five pieces of the same gray paper. Lay them on sheets of white, black, red, green, and blue paper. Cover with very thin tissue paper. Compare the five grays.

Take two pieces of the same green paper. Lay one on a red background, the other on a background of its own color. Cover as before and compare the two greens. Do similarly with red on a green and on a red background.

Experiment 20. The Law of Diminishing Returns.—On a sheet of paper 10 inches or more wide rule five lines 20, 40, 60, 80, and 100 millimeters long respectively. Place beside it a similar sheet and draw lines as nearly equal to the models as you can without measuring or superposition. Do the same thing with another sheet, and continue until you have ten sheets, each with five lines as nearly equal to the original models as you can draw them. Find, by measuring, the error made in each of the fifty lines. Compare the amount of the error for the 20 mm. line with that for the 40 mm. line and so on through the series.

Experiment 21. The Law of Association in Perception.—Print in the same style and size each of the following words upon a slip of paper and paste on a card $3\frac{1}{2}$ by $1\frac{1}{2}$ inches: (1) good, (2) boy, (3) house, (4) pasent, (5) scarf, (6) sdirt, (7) chip on, (8) feather, (9) tackle, (10) tooch drwn, (11) genuine, (12) meawing, (13) reaconing, (14) initate, (15) stoie, (16) morning, (17) frequmtly, (18) constant, (19) embrarderg.

Expose each (in the order given above) for one or two fifths of a second to some one unacquainted entirely with the cards or the object of the experiment and have him write down what he sees in each case. Explain so far as you can the percepts felt. Compare the records of men and women in the case of words 6, 7, 9, 10, 15, and 19.

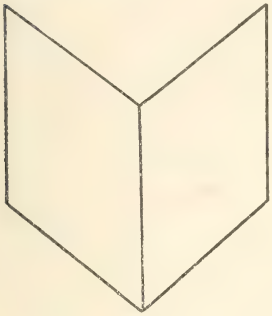

FIG. 78.

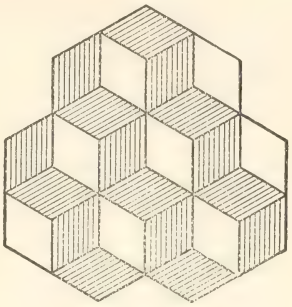

FIG. 79.

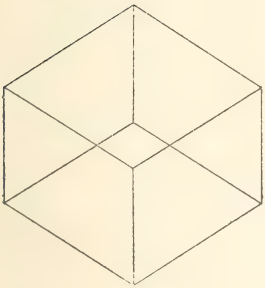

FIG. 80.

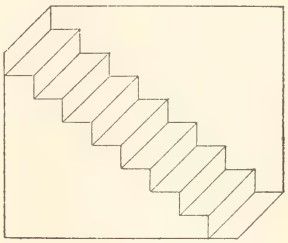

FIG. 81.

Experiment 22. Look at Fig. 78. Does it seem to be (1) a folded sheet with the folded edge toward you, or (2) a folded sheet with the folded edge away from you, or (3) a group of lines on a flat surface? Continue looking at it steadily. What happens? Make it seem like (1) (without altering the figure itself at all). Make it seem like (2). What do you do to make it seem

like (1)? Shut your eyes; imagine a sheet of card-board with the folded edge away from you, open your eyes and look at the figure. Which was it like, (1), (2), or (3)? Make it seem like (3). Which appearance is hardest to obtain, (1), (2), or (3)?

Experiment 23. (*a*) How many blocks are there in Fig. 79? Continue looking at it steadily. What happens?

(*b*) How many different appearances can you get from Fig. 80? Describe each of them. Why does it seem like an object of three dimensions rather than of two only, when it really is all in one plane?

(*c*) How many different appearances can you get from Fig. 81? Describe each of them. Which is the easiest to get and retain? Why?

8. In what other experiments have you found the alternation of one impression with another in somewhat the same way as happens in experiment 23?

9. Illustrate from your record of experiment 22 the statement: "What thing is perceived will depend upon past experience."

10. Illustrate similarly: "What thing is perceived will depend upon the state of mind at the time of perceiving."

11. Illustrate similarly: "Perception is of definite and probable things."

12. Illustrate similarly the influence of frequency of connection in determining what percept a given sense stimulus will arouse.

13. From your records of experiments 18, 19, 20, 21, 22, and 23 gather all the facts you can in support of any statements made in this chapter.

Arrange these in lists, each under the statement which it supports.

OUTLINE OF TOPICS IN EDUCATIONAL PSYCHOLOGY

I. The science of psychology as a basis for the art of teaching. The limitations due to individual differences in children, to the conditions of class teaching, to the personality of the teacher, and to conflicting forces outside the school.

II. Means for receiving stimuli and responding to them.
The sense organs.
Motor apparatus.
The connecting apparatus.

III. The applications to teaching and class management of the psychology of attention.

IV. The applications to teaching and class management of the psychology of instincts.

V. The applications to teaching and class management of the psychology of capacities.

VI. The applications to teaching and class management of the psychology of the law of association.

VII. The applications to teaching and class management of the psychology of the law of analysis.

VIII. The applications to teaching and class management of the psychology of connections of impression.

IX. The applications to teaching and class management of the psychology of connections of association.

X. The applications to teaching and class management of the psychology of connections of expression.

XI. The applications to teaching and class management of the psychology of imagery.

XII. The applications to teaching and class management of the psychology of the emotions.

In case of topics III to XII, direct application is made by the student of the facts obtained in general psychology under topics III–VIII and XII–XX, together with related facts drawn from child study.

XIII. Interests.

XIV. Mental training.

XV. Incentives and deterrents.

XVI. The correlation of studies.

XVII. The relation of physical well-being to successful class work.

XVIII. A review of the advantages and disadvantages of typical features of general method, such as developing questions, motor expression, inductive approach, and the like.

XIX. The study of text-books and lesson plans from the point of view of educational psychology.

XX. The study of typical special methods from the point of view of educational psychology.

Exercises (to go with part of IX of the outline)

References: Review the work of XVII, 48, and 49, of the syllabus in general psychology and read chapters VI–VIII of McMurry's *Method of the Recitation* and sections 11–13 of Thorndike's *Notes on Child Study.*

1. Which kinds of mental states are especially necessary in reasoning?

2. Why is it so often more useful for one element or feature of a fact to call up the next thought than for the total fact to do so?

3. What means would you take to secure such partial activity of a fact in a pupil's mind?

4. What means would you take to secure the activity of the right or essential part?

5. What is the result of the comparison of facts?

6. What devices would you use to make comparison easy in teaching tense? In teaching the principle of the balance? In teaching the order of the sentence in German?

7. When the right element or aspect of a fact is selected, what more is necessary to secure the right conclusion?

8. Illustrate failures in reasoning in geometry, in grammar, and in geography due to the absence of knowledge—the absence that is, of certain facts or connections between facts.

9. What are the differences between inductive reasoning and deductive reasoning? What are their resemblances?

10. What would be an inductive method of teaching a class to understand the meaning of "noun" and "verb"; that four threes make twelve; of teaching French or Latin; of teaching that the three angles of a triangle are equal to two right angles; that -9 times -3 gives $+27$?

11. Which of the above would you think more properly taught deductively?

12. Name a school subject which begins with and continues with general and abstract notions.

13. Name a school subject which deals almost exclusively with individual facts.

14. What would be a deductive method of teaching French or Latin?

15. What grammar school subjects involve most deductive reasoning?

16. What high school subjects?

17. Illustrate the following statement in the case of teaching "voice" in English grammar, or the acid-base reaction in chemistry, or the first steps in the multiplication of fractions:

Good teaching by inductive methods depends upon a clear statement of the goal aimed at, the selection of enough and representative individual facts, their arrangement in such a way as to make the general idea or judgment they lead to obvious, and the reinforcement and clarification of the general idea or judgment, when obtained, by applying it to new individual facts.

18. Illustrate the following statement in the case of teaching a proposition in geometry, or the parsing of a sentence, or the deposition of soil by flowing water:

Good teaching by deductive methods depends upon a clear statement of the goal aimed at, independent search by pupils for the proper class under which to think of the thing in question, criticism by them and by the teacher of the different classes suggested, and appreciation of the reasons why the right one is the right one.

The psychology of the processes, other than correct induction and deduction, on which the accurate feelings of meanings and judgments and the adroit inferences that constitute comprehension depend, is not well worked out, and we can only apply certain rather vague principles.

19. Could a person reason well or follow intelligently a train of reasoning about a class of objects if his knowledge of the individual members of the class were imperfect?

20. Could a person comprehend statements about a quality, say bivalence, if he did not know the essentials of that quality?

21. Would he comprehend the answer to a question better if he were first made to realize the question? Why?

22. If the habit of comparing things and the ability to see the essential elements in a thing and ready knowledge of the properties of these elements are the characteristics of the good reasoner, what sort of teaching would make students reason well?

23. In which case would a student be the more likely to comprehend a theory or argument: if he had his knowledge in the form of images, for instance of a leaf of certain shape, or if he had it in the form of a judgment that the leaf was of that shape?

24. Which of the qualities of teaching that are efficacious in gaining attention are also efficacious in gaining comprehension?

25. Should one example or many be given with a definition? Why?

26. If all judgments refer eventually to real objects, will it be generally safe to trust that judgments can be comprehended without actual demonstrations, experiments, and object lessons?

The processes by which people think things out often cannot be followed at all. To some people the right idea simply comes, they know not whence or how. We say that such possess tact or scientific insight or instinctive business ability or what not, but we cannot give their rationale.

To all outside appearances such people simply guess, but they guess right. The essential element is picked out automatically. The idea that comes without any rational procedure is still the one that fits the situation.

27. If you defined this general feeling for the truth of things as the power to guess right, how would you try to cultivate it in a scholar?

28. Do teachers customarily encourage children to guess?

29. When has any one a right to guess?

We have already seen that knowledge in the form of definite judgments is superior to knowledge in the form of hazy images, that recalling ideas from within is better than repeatedly receiving them from outside, that we test and increase our comprehension of a matter by applying it ourselves. All these things point to the fact that the expression of our ideas clarifies and renders permanent our knowledge. Moreover, knowledge is eventually of value only as expressed.

30. Why?

31. What other means of expression should the teacher secure besides words?

32. How may examinations be made useful means of expression on the part of pupils?

33. Can a pupil express his feelings by silence?

34. What facts cannot be truly expressed in pictures, models, or the like?

35. Clearness, vividness, accuracy, completeness, convenience, economy of time, and permanent effect are the qualities desirable in any means of expression. Which of them are possessed in high degree by drawings? By models made? By schematic diagrams? By spoken words? By gestures? By written words?

36. Triviality, waste of time, absorption in technique, vagueness, and meaninglessness are the qualities to be avoided in any means of expression. To which of these is expression in words liable? Expression in drawings and models? Suggest means of avoiding them.

References: Review the work of XVI, 46, and 47 of the outline of general psychology.

In order to be fruitful, what we teach must not only be attended to, appreciated, and understood, but also be made the pupil's permanent property. No apology is needed for the teacher who gives much thought to the best ways of aiding her scholars to remember. This is especially true if we bear in mind that memory is a wider function than mere verbatim knowledge, and includes permanent appreciation of the meanings of terms, of general facts and tendencies and laws.

There are three common ways of memorizing, by repetition, concentration, and recall. 1. Which is the one commonly used by children? 2. Which is the one commonly advocated by teachers? 3. Which is the best? Why?

Ebbinghaus found that it took sixteen repetitions to learn a series of twelve nonsense syllables, and fifty-five repetitions to learn a series of twenty-six. 4. What suggestion would you get from this concerning memorizing poems, model sentences, quotations, etc.?

Miss Aiken found that a poem could be best learned by learning a skeleton of the leading words, verbs, etc. 5. What suggestion would you get from this concerning learning about a period in history or a topic in geography?

Pupils often can recite a multiplication table glibly, and yet be slow and inaccurate in answering any one question, *e. g.*, how much is 7 times 9; they often can conjugate a Latin verb through glibly, and yet fail to translate readily any given form.

6. What suggestion would you get from this concerning the nature of the associations to be formed in learning tables, grammatical forms, and such things? 7. How would you apply the same facts to learning spelling?

The secret of remembering things is having them associated firmly with those things in connection with which they will later be wanted. 8. How would a systematic arrangement of subject-matter help pupils to remember it? 9. How would cross-references help?

In learning lists, the order of points of a discourse, etc., arbitrary devices of associating the different elements with other things are often helpful. 10. Which ones have you ever used? 11. Which seem the most useful?

OUTLINE OF TOPICS SUPPLEMENTARY TO THE WORK IN GENERAL AND APPLIED PSYCHOLOGY

I. The general problems of education
   - The processes of changes in human nature
   - Aims of changes in human nature
   - Material of changes in human nature
   - Means of changes in human nature
   - Methods of changes in human nature

II. Knowledge of human nature
   - From physiology
   - From psychology
   - From sociology

III. The problems of educational psychology
   - Those of the theoretical student of education
   - Those of the administrator and teacher

IV. Contributions of educational psychology
   - Knowledge of general facts and laws of human nature, provided by general psychology, especially dynamic psychology
   - Knowledge of mental growth and the facts of children's minds, provided by child psychology
   - Knowledge of individual make-ups, of deviations from the type, provided by individual psychology

V. The influence of original nature and heredity

VI. The environment as a formative agency

VII. The influence of special training on general abilities
VIII. The influence of the environment as a selective agency
IX. Individual differences in mental traits
X. The special psychology of the elementary school age
XI. Adolescence
XII. Methods of study in education
    Observation
    Experiment
    Comparison
XIII. Aids to observation. The criteria of a scientific observation
XIV. Experiment in education
    Advantages
    Limitations
    Criteria of a scientific experiment
XV. The study of methods of teaching reading
XVI. The study of methods of teaching spelling
XVII. The study of fatigue.

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Edited by Dean James E. Russell

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ANNOUNCEMENT OF VOLUMES VI AND VII

1905 and 1906

The May number of the TEACHERS COLLEGE RECORD will present a study on City School Expenditures, by George D. Strayer. This study is based on special reports of expenditures kindly furnished during the past two years by some fifty-eight cities in New England and the Middle States.

The special feature of the year 1905–06 will be a series of monographs on the elementary school curriculum, by teachers of the Horace Mann Elementary School, with the co-operation of Professor Frank M. McMurry and Principal Henry C. Pearson. The four numbers will present the practical work of the different grades as follows: first grade; second and third grades; fourth and fifth grades; sixth and seventh grades. Applications for the set of four (price, $1.00) will be filled in order of receipt, as numbers are issued.

Other issues now in preparation will deal with "Problems of Secondary Education," "Manual Training," and "Nature Study."

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TEACHERS COLLEGE RECORD

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SCHOOL HYGIENE

THE SCOPE OF SCHOOL HYGIENE IN MODERN EDUCATION

By THOMAS D. WOOD, M.D., Professor of Physical Education, Teachers College

The attention given to school hygiene at the present time is desultory and spasmodic. This department of school work has as yet no well-defined and established place in educational theory and practice. The best developed phase of this field is the medical inspection of schools for the control and prevention of infectious and contagious diseases. This is important for school and community, and is conducted measurably well in a number of our cities. It is primarily, however, a public health measure and represents only an external phase of school hygiene.

This subject, particularly in some of its more vital aspects, will not have the recognition in practical education which it deserves so long as the schooling process is so abstractly cultural on the one side and so concretely utilitarian on the other; so long, again, as the conscious end of education is so partial and temporary, as compared with the responsibility of the school with reference to the entire life of the individual and the welfare of human society. Not until education has the advantage of a larger vision, a keener prescience, and is inspired to a wiser practice by an ethical principle,—an altruism which will subordinate the achievements of childhood to the realization of mature power, and, even more, subordinate the entire career of

the individual so far as may be necessary to the present and future welfare of society and the race,—will some of the less conventional but more fundamental values in education receive adequate recognition and care, and among these the various interests belonging to the field of school hygiene.

The argument for this attention to the various aspects of health begins in the very nature of life and in the manner of its evolution. The biologist defines life as the adjustment of an organism to its environment. In the organic world this is for the most part an instinctive, rather unconscious, and impersonal process. Human life in civilization, on the other hand, involves the conscious, intelligent understanding of both organism and environment. Successful human living requires the rational adjustment of the organism to the changing, complex, and increasingly difficult environment, a certain skilful adaptation of the environment to the organism, and the training and development of the child up to maturity, in order that he may play his responsible part in the intricate process.

Public education is the process by which the State prepares the individual for his immediate and larger life in society. The State, as the responsible agent of society, should, through public education, instruct and stimulate the home, as the most fundamental and important human institution, to do all that it can and will for the training of child life. Much of the important work of education will be expressed directly and indirectly in the home. But, after all, it is the function and duty of public education to do all in the care and preparation of the child for society and complete citizenship which cannot be, or is not, done in the home or elsewhere, even if this involves provision for physical and health needs.

The first care of education should be the preservation and improvement of health and the securing of the highest organic efficiency possible to the individual. School hygiene in the past has been too largely concerned with the child's environment and the external conditions affecting his health, such as the school building, its sanitary features, and the sources of infectious disease. These features should not be neglected, but the pupil with his own personal status and problems should be understood, and his adjustment to the environment of school and of his life outside should be more carefully considered. School

hygiene should be responsible for all the phases of education directly related to health. These various interests, some already provided for in part, and many others as yet neglected, should be unified and co-ordinated as much as may be necessary for the effective attainment of health results and economic school administration. Special teachers or supervisors should be trained as health specialists, and made responsible for the different phases of school hygiene.

With reference to the scope of this subject, the first factor is one directly related to the field of child study. This is the biologic examination of the child. This investigation of the physical and organic condition and tendencies of the child should be repeated at intervals varying according to age and individual necessity. Dr. George Gould, in discussing the value of such studies, has called them "periodic biologic examinations." They should combine certain features of physical, anthropometric, and medical examinations, and something more. No one or all of these terms with their ordinary meanings explain the full purpose of such examinations. It is not simply to determine the physical state, to measure and test the body, nor is it solely for the purpose of improving health, though all of these are important enough. This examination will not, in fact, for many reasons cannot, be made by the family physician. The examiner must have medical instruction, and besides this certain scientific and educational training which neither physicians nor teachers usually get.

The examination should be conducted from the standpoint of education, in a uniform manner and with a common purpose so far as any school or locality is concerned. The more formal examination should occur at the beginning of each school year. In most instances it is desirable to have a second examination near the close of the year. In special cases it may be necessary to repeat the examination frequently, in order that abnormal tendencies may be watched. For the study of interesting problems of growth and development it will be desirable to make a few measurements and tests, perhaps quarterly or monthly. The inspection of pupils from day to day for the detection of disease may be carried on independently of the general examination, or, where more convenient, it may be a part of a combined system of health supervision. The medical

inspection of pupils, where it is done at all in the United States, is usually conducted by physicians appointed by the Board of Health. This medical inspection is very important for school and community. It is carried out more satisfactorily, perhaps, in New York[1] than in any other American city.

Worthy of special mention in this connection is the work of the school nurses who go about from school to school, in the more crowded regions of the city, carrying out the instructions of the doctors in the treatment of certain ailments of the children; directing the mothers in the care which they should give to their children at home, and doing valuable service which would otherwise usually be neglected. This feature of the larger work of school hygiene was inaugurated in New York in 1902. At present there are nineteen school nurses in Manhattan.

Dr. Cronin closes his article—reference to which is given in the footnote—with the following very suggestive statements:

> I believe that as far as the medical inspection of schools, *per se*, can accomplish good results, the work, as conducted by the Department of Health of New York City, is obtaining its end; but there are many considerations over which our department has no control, as for instance: (1) The proper care of the children's outer garments at school. (2) The proper aeration of the class-rooms. (3) The proper lighting of the class-rooms. (4) Ample accommodation for each school child. (5) Sufficient playground facilities. (6) Establishment of baths in the public schools. (7) The adoption by the Board of Education of a sensible, honest, feasible curriculum of studies. Examination and compulsory care of the children's teeth and oral cavities. Examination and correction of error of refraction. About 30 per cent. of 981 children examined showed refractive error in one or both eyes. (8) Correction of deformity of locomotive apparatus. (9) Exclusion of all nervous diseases from class attendance (10) Removal of all hypertrophied tonsils and other adenoid vegetation. (11) The segregation of children with inferior mentality. (12) The unhygienic, filthy, overcrowded way in which families are compelled to live in dilapidated tenements whose only purpose to the municipality should be for destruction, requires to be changed before the millennium of health in school children can be reached. Absence of control over the above factors renders the predisposition to disease great and its annihilation insurmountable.

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[1] An instructive account of the medical inspection of schools in New York City appears in *The School Journal* of December 10, 1904, in an article entitled: "Precautions Used by the New York City Department of Health to Prevent the Spread of Contagious Disease in the Schools of the City," by Dr. John Cronin Assistant Chief Medical Inspector.

I certainly do feel hopeful, however, that while all the good that we would wish for may not be realized in the present generation of school children for the reason that they, too, are powerless to change their environment, the labor bestowed upon them now will so dissatisfy them with their present conditions and surroundings that they will demand—and they must have, for no power can gainsay public indignation and dissatisfaction—better homes for the bringing up of their children, and the latent pride that is in their breasts will become active and exhibit itself in the better hygienic care of their children.

Then, as far as bodily cleanliness and disease are concerned, there will be no lower classes. Education will have made us all equal, and the purpose of medical inspection of schools established by the Department of Health in the city of New York will have been realized.

Inasmuch as great numbers of pupils must be examined so rapidly, there is always danger that the inspection of the Board of Health physicians will become a perfunctory service, or result in the detection of only the most serious and obvious forms of disease, and that many conditions and tendencies will be overlooked. The inspection of the Board of Health should in no way take the place of the more general biologic examinations, which should be made by properly qualified school officials. There is a growing conviction on the part of those who appreciate the conditions of childhood through different lines of approach that such examinations are important and worth while. The laws of evolution operate in the human species as elsewhere. The fittest survive and the unfit gradually disappear in any case. But without the intelligent care of health and life which is possible there is inestimable human failure and economic loss that might be avoided. There is, perhaps, no more important development of wisdom and prudence than that which conserves the biologic human values, and most of all in childhood.

It cannot be taken for granted that the organic condition of the child will be sound. Under our present conditions of life and education it is possible in any case, and certain in a considerable number of cases, that normal growth and development will not proceed without individual care and adjustment; that there may be present, without special symptoms of disorder, physical defects of a more or less serious character. The only rational and adequate basis for the direction of the child at home or in school is the thorough knowledge of the physical status, so that existing conditions and tendencies may be recognized, and

important changes noted, and so that it may be known that growth and development are proceeding satisfactorily, or, in case of abnormalities of any kind, that these may be corrected as soon as possible.

Dr. Hertel, in his well-known investigation of the health of pupils in the better-class schools of Copenhagen before 1885, found that of the boys 31.1 per cent. and of the girls 39.4 per cent. were sickly.

Dr. Francis Warner in the examination of 50,000 school children in London found that 10.8 per cent. of the boys and 8.5 per cent. of girls had abnormal nerve signs; 7.9 per cent. of boys and 6.9 per cent. of girls were mentally dull; 8.8 per cent. of boys and 6.8 per cent. of girls had had some developmental defects. Of the cases with developmental defect, 38.4 per cent. of the boys and 49.9 per cent. of the girls were mentally dull. Of those who were mentally dull, 57.6 per cent. of the boys and 52.6 per cent. of the girls showed abnormal nerve signs.

Dr. Risely examined the eyes of 2422 school children in Philadelphia and found that 44.7 per cent. had some deficiency of vision.

Dr. Sexton examined 570 school children in New York City and found that 13.3 per cent. had deficient hearing in one or both ears. "Of these only one was known by the teacher to be defective, and only ten knew themselves to be deficient in this sense." Many children have been considered mentally dull and backward who were simply partially deaf.

Examinations of 40,000 school children by school physicians in the Duchy of Saxe-Meiningen, Germany, in 1900, showed that 23 per cent. were myopic, 10 per cent. or more had spinal curvature, and 60 per cent. had teeth which needed attention.

Examinations of 900 pupils in the Horace Mann Schools of Teachers College during 1902–1903 showed that 34 per cent. had myopia, 12.9 per cent. had functional heart disorders, 5.6 per cent. had spinal curvature with some vertebral rotation, 31.2 per cent. more had asymmetry of spine, hips, or shoulders, 14.6 per cent. had adenoids or chronically enlarged tonsils. In over 10 per cent. of the cases letters were sent to parents, recommending that medical attention be given to some physical condition.

It is not possible to exaggerate the importance of recognizing

such conditions as the above at an early age and doing all for them that science can suggest. The examinations should include the information about the child's health, habits, and tendencies furnished to the school by the home; the observation of the keen-visioned teacher, trained to note important signs; and the result of the study of the special examiner. More specifically, the examination should include some measurements, not too many, but those which are worth while. There should be tests of sight,[1] hearing, and of the nervous and muscular systems. Further, there should be examinations of general form and symmetry of the body, of posture and mechanical adjustment, of spine and feet, of heart and lungs, of teeth, of throat and nasal passages, where, in younger children more particularly, the presence of enlarged tonsils and adenoid growths often injures health and interferes, perhaps seriously, with mental and bodily development. Beyond this there should be judgment of nutrition and general vitality, and, finally, an estimation of temperament and other general characteristics difficult to define but important to take into account. Methods of science and instruments of precision should be utilized so far as may be practicable. The observations and judgment of the

[1] A bill has been passed by the Vermont legislature, to take effect July 1, 1905, looking to the better care of the health of pupils in public schools, which provides:

"The State Board of Health and the Superintendent of Education shall prepare suitable test cards, blanks, record books, etc., to be used in testing the sight and hearing of pupils in public schools, and necessary instructions for their use; and the Superintendent of Education shall furnish the same, free of expense, to every school in the state. The superintendent, principal, or teacher in every school, during September in each year, shall test the sight and hearing of all pupils under his charge and keep a record of such examinations according to the instructions furnished; and shall notify in writing the parent or guardian of every pupil who shall be found to have any defect of vision or hearing or disease of eyes or ears, with a brief statement of such defect or disease; and shall make a written report of all such examinations to the Superintendent of Education as he may require.

"The State Auditor is directed to draw his order on the State Treasurer for such sums and at such times as the Superintendent of Education, with the approval of the State Board of Health, may require to carry out the provisions of this act. The total expense under this act shall not exceed $600 in any biennial term."

child should be thorough and complete and those of a wise and carefully trained examiner.

The information gained should be furnished to the home, and through the home the attention of the family physician or of a medical specialist should be directed to conditions about which there may be question. There are, of course, technical medical examinations and tests which it is not necessary nor desirable for the school examiner to undertake. The coöperation between school and home is of mutual advantage, and of great importance in this as in all other matters which concern the child's welfare. The teacher, again, should have all of this special information which will help to a more favorable adjustment of school work. This biologic knowledge is essential to any true or just estimation of the pupil's intellectual power or capacity, and to an understanding of personality and individual characteristics.

The meaning of facts learned in these examinations should not be exaggerated or misinterpreted. Parents must not be needlessly alarmed about real or supposed ailments of their children, but may be helped to give them intelligent and effective care.

This examination, let it be repeated, must have a broad educational motive. It is the fundamental feature of school hygiene, and should be the basis of all education.

In the second place, school hygiene should test and judge the entire environment of the school and its adaptability to the pupil and its effect upon health. This is, in general, the phase of school hygiene which has received the most attention. It includes the study and supervision of the schoolhouse, its site and surroundings; the construction, arrangement, and equipment of building and rooms. In this connection it is important to emphasize the necessity of adding rooms in the larger school buildings for the examinations of pupils and for the use of the medical inspector. There should be, in addition, small emergency rooms for pupils in case of sickness or accident. Such rooms are sometimes included in school plans, but are more often lacking.

School sanitation involves, further, attention to light, heat, ventilation, wall colors, furniture, blackboards, charts, books, and the various materials of many kinds used increasingly in modern education. The study of the school environment from

the standpoint of hygiene is bringing about a different standard, and leads gradually to the selection of better, often more expensive materials and appliances for the school plant and its equipment. It is the duty of the school hygienist to keep all these factors under supervision and observe their influence upon the health of the pupils.

To be included, also, in this department of the subject are the hygiene of instruction, methods of study, of recitation, and of school examinations, home study, length and arrangement of the school periods, recesses, school lunches, alternation of activities in the schedule. All of these items in this passive and active school environment of the pupil, including the teacher even, should be subjected to careful study and judged partly and primarily from the standpoint of health.

Health is not everything. It is not to be considered in itself as the exclusive end of living. It should not be the main or final goal of education. It is, however, an absolutely essential means to forms of human achievement of most worth. It is even more essential to the welfare of the future than of the present, if the race is to progress and not deteriorate. The health of the adult under certain conditions may be justifiably sacrificed to other ends, but the claim is made with great confidence that the health of the growing child may be sacrificed to nothing; that nothing may be allowed in education which injures or interferes with the pupil's health in any way whatever; nay, more—that, with our present and larger social view of education, its first care and effort, as has been stated earlier, should be preservation and improvement of health and organic power and efficiency, as the fundamental condition of individual and social well-being.

"School life," as Dean James E. Russell of Teachers College, New York, so well pointed out in his report of 1901, "is a highly artificial product of modern civilization. It is to-day one of the most sedentary occupations in which workers are engaged, and its social significance is readily discoverable in the fact that approximately fifteen millions of children—more than one fifth of our total population—are being influenced for good or ill by the schoolroom environment. Serious as are the evils of sedentary occupations in general, their disadvantages are especially emphasized in the case of growing children, who are often unduly crowded together in our public schools. Moreover, the urban

tendencies of our population make it extremely difficult to secure to the young that which is essential to their physical well-being—namely, light and air and freedom of movement."

Too much care cannot and will not be given to the health side of education if educational values are kept in their proper sequence and relation. Moreover, if the interest in school hygiene is unprejudiced, unselfish, and directed always and solely toward the welfare of the child, the motive of the school cannot permanently be misjudged, and it may perform an important service to society by advising the home with reference to a more rational care of the child outside of the school.

In the third place, it is the function of school hygiene, through the instruction which is called physical training, to provide for those larger motor activities which should supplement the exercises and movements required by other school work. These larger fundamental movements are necessary to counteract certain undesirable tendencies in posture and action of school life, and for the health and complete organic development of the pupil. The beneficial effect of this training upon the nervous system, upon mental and even moral qualities, may be as important and definite as that upon the body in general. In this scheme of physical education there should be grouped and coordinated the more formal gymnastics and games; the simple corrective and relaxing exercises to be used between classes, and the free play of recess periods. It is desirable to correlate the gymnastics, as far as may be practicable, with the interests of regular school work, and to make them in any case more rational, practical, and serviceable than they have been in many ways in the past. It is not in place now to discuss further the details of the technical work of physical training, but simply to state that this belongs to the broad field of school hygiene. The biologic examinations which have been described will give most necessary and valuable information as a basis for the adaptation of exercise and the direction of the general physical education of the pupil.

Finally, school hygiene should provide for the instruction of the pupil in matters relating to health and hygiene. No knowledge is of more worth than that which bears upon the immediate problems of living. Human life must always rest upon a biologic basis. People know less instinctively how to

live as civilization advances. The study of the science and art of health must play an increasingly important part in the education of the future. In a recent popular article on health, Dr. T. Mitchell Prudden, one of our best authorities on general hygiene, emphasizes the importance of this factor in education in the following words: "One of the most urgent necessities of the coming years is education in personal hygiene. This knowledge of the ways of healthful living must be systematically imparted in the schools, and it should not be perverted, as in many instances it is to-day, to prove the worthy but narrow aims of an anti-alcohol or anti-tobacco crusade." Farther on he adds, "Honest hygiene must be taught in the schools." [1]

Various attempts have been made to provide for the teaching of hygiene. Sometimes it has been a dilution of medical study; sometimes a painful effort at temperance instruction; and again, an attempt to apply the facts and principles of science and biology (particularly) to the teaching of health. No subject, perhaps, is more difficult to teach successfully; none is more important.

The material and methods of health teaching are to be largely revised. Hygiene instruction should continue throughout school life. It should be given in the elementary school by the grade teacher. It is better, particularly in the lower grades, not to have it taught always as a separate subject or with a textbook. There should, however, be formal courses in hygiene and physiology in the seventh or eighth grade and in the high school.

All school instruction of vital interest, more particularly in science and nature study, should be related directly or indirectly to the problem of practical living, and the application to health and life should be made throughout school work wherever there is a rational and reasonable opportunity.

All of the health instruction should be under the supervision of a special teacher, that there may be rational progression in matter and method through the grades, the working out and suggestion of correlations with hygiene which seem practicable, and the effective teaching of the subject, where it is given as a special course.

[1] Attention is called in this connection to the Report of the New York State Science Teachers Association on *School Instruction on the Effects of Alcoholic Drinks and Tobacco*, issued in 1904.

In conclusion, if the work of school hygiene is to be successfully accomplished there must be:

1) An educational philosophy which recognizes health, not as an end in education or life, but as an essential means to human achievement, immediate and remote; a philosophy, again, which provides practically for the preservation and improvement of health and the development of those fundamental organic qualities which are so essential to the success of the individual, and even more to the integrity of the race and the permanent welfare of society; and, finally, a philosophy which makes place and means for the instruction of the young with reference to life on its biologic side, so that they may intelligently and successfully meet the problems of living as these present themselves.

2) The different purposes of this health side of education may best be accomplished by uniting the fields of school hygiene and physical education under one department of school effort for the purpose of supervision and administration. The position of teacher or director of physical training is already recognized and provided for in many schools. The efforts of this special teacher are, or should be, devoted primarily to the interests of health. This field may be advantageously enlarged and called physical education and school hygiene. Professional schools and courses of instruction are needed for the training of these health specialists. The special teacher or supervisor must be trained very thoroughly and broadly to meet effectively the demands of this larger, more dignified, and richer field of education. These specialists in hygiene should be prepared to look after the various interests of this field; to supervise that part of the work which falls naturally to the grade teacher or to others, and to perform well, from every point of view, the work which belongs logically to the health specialist.

3) The special teacher of hygiene, however, can alone do very little of this large and varied work. Every teacher, supervisor, principal, and superintendent should have a keen and intelligent appreciation of health values and interests, and of the measures necessary to preserve and foster them. If our general teachers and educators are to have this understanding of hygiene, which is essential to their effective coöperation in the united effort which is needed, there must be—beyond the general

instruction in hygiene in school and college—thorough courses in physical education and school hygiene in all the normal and training schools and colleges for teachers. Such courses are being advocated and introduced into some of the normal schools of Germany and other European countries, and are finding place already in a few institutions in the United States.

THE PREVENTION OF TUBERCULOSIS IN SCHOOL CHILDREN[1]

By ABRAHAM JACOBI, M.D., LL.D., Emeritus Professor of Diseases of Children, College of Physicians and Surgeons

LADIES AND GENTLEMEN:

Some weeks ago the Charity Organization published a *Handbook on the Prevention of Tuberculosis*. Among the contributors to it are some of the most eminent physicians and authors of New York. Thus its statements may well be accepted as authoritative. Indeed, I know of no volume which will communicate the same information on the subject of tuberculosis in as concise, handy, and skilful a manner. While commending its perusal to all of my hearers, I know I cannot add to its wealth of ideas and its storehouse of truths. What is left for me, therefore, is to apply many of the facts to a special topic, namely, the problem of tuberculosis in connection with school teachers and pupils.

I do not feel certain that there are not many here who are well acquainted with some or most of what I shall have to say, for tuberculosis has for years been the subject of discussion, in lectures, societies, magazines, and newspapers. Some part of the subject is known to everybody. What we call consumption, that is, tuberculosis of the lungs with formation of abscesses and the usual or frequent termination of the disease in death, is of daily occurrence and many of you have met it amongst your friends and relatives. If statistics do not lie, there is no large company that does not harbor candidates or victims of the malady in some form or another. Is there anything that should be studied with greater persistency by those who, like you, are stationed between science and its application, and who have more ample opportunity to disseminate useful knowledge than most other professional people? Nor should the knowledge of the teacher be superficial. Only what is thoroughly understood can be applied or taught in plain words; and plain language is required when you mean to instruct a child, and, through the child, its family. You have or will have to deal with the young at a time when his mind is most receptive and his tongue most

[1] Lecture delivered before TEACHERS COLLEGE.

communicative. That is why a number of plain rules are readily grasped and understood by a child, and the child taught by you may prove a teacher at home for his father and mother, who have not the time to read, though some of them may have more literary material than mere sensational newspaper gossip. In this way the knowledge of the nature and the prevention of tuberculosis may become disseminated, and the disposition to the dread scourge may be recognized and gradually extinguished.

Every educated person, certainly every one of you, knows perfectly well that tuberculosis is the direct result of the presence in large numbers of a minute microbe, the bacillus of tuberculosis, or its toxin (or virus) in the body of the patient. Its influence need not be immediate. It may be buried away in some part of the organism for a long time waiting for its chance. That chance will come when some other disease, particularly one of an inflammatory character, breaks out, or when such microbes as are the cause of or connected with suppuration, in small or large abscesses, combine their forces with those of the bacillus. In such a case the outbreak is apt to be a very sudden one and we have an instance of so-called acute tuberculosis or rapid, or florid, or hasty consumption.

Of the location and the frequency of tuberculosis in the very young I spoke a year ago at another place. In the infant and the very young child, where you personally have few opportunities of close observation, tuberculosis may be found as a chronic disease, in the end of a bone, or in a gland; also in the pleura and peritoneum; in its acute state mostly in the brain and a number of other organs where it is almost invariably fatal. In your profession you have to deal with children after the sixth or seventh years and with adolescents, in whom tuberculosis is very apt to follow the same course and exhibit the same symptoms which are met in the adult. Here you find it mostly in the lungs. In not a few cases tuberculosis may be easily recognized, or at least suspected. When you have to deal with a child that is unusually pale, or of low weight, easily exhausted, with glandular swelling about the neck and narrow chest, tuberculosis should be suspected and proper care should be taken, for it should never be forgotten that tuberculosis may heal or be made to heal.

As a modification, or as suspicious or incipient symptoms,

you will not infrequently notice the symptoms of what has been called scrofula. Scrofula is observed in two forms. There are a number of children, usually brunettes, with dark hair, florid cheeks, brilliant eyes, low weight, quite frequently with good mental capacity, who display diseases of the mucous membranes; their eyes are frequently sore, some of the glands of the neck, perhaps many, are considerably swollen. The other form of scrofula is a more sluggish or torpid one. The children are rather heavy, flabby, mostly pale, with large and rather hanging cheeks, and big lips, and there is swelling of the nose and considerable tumefaction of glands about the neck, with not infrequently sore eyes, ears, and skin. This is the usual form, and the one which is apt to lead into tuberculosis during school age. That is why I wish to direct your special attention to this form of disease. Of great importance in connection with it is the presence of those glandular swellings round the neck, and it is to this that I ask your attention for a few minutes.

You know that the circulation in the animal body is twofold—first, that of the blood; second, that of the lymph. The lymph is disseminated through the body in every organ, but particularly in and below the mucous membranes. The absorption of chyle as furnished by digestion takes place from millions of small glandular bodies, many of them of microscopic size only. They are disseminated over the intestinal mucous membranes, whose contents they absorb and carry off into larger vessels, and from them into lymph bodies or so-called glands of the mesentery, in the immediate neighborhood of the intestines. They are very numerous all over. From them the current goes on into still larger vessels until finally they terminate in a large duct, the thoracic duct, which discharges its contents into the circulation of the blood. That circulation in the lymph is very extensive and copious. It has been found that an artificial opening made into the thoracic duct of a young dog furnished lymph to the amount of between one-sixth and one-tenth of the weight of that dog within one day, while an adult dog furnished lymph amounting to only one-tenth to one-sixteenth of the body weight. In the same way the lymph apparatus in a young child up to advanced childhood and adolescence is very much more active than it is in the adult.

That is why the condition of the lymph glands in the young

is of such importance. Whenever there is any infection of the mucous membrane, the infecting poison is carried off to the next gland where there is a stopping-place. That gland will become the seat of irritation or swelling. That is why—to give you an example—whenever there is only a slight diarrhœa, no matter from what cause, over-eating, improper food, medicines, typhoid, colds—never from dentition, for there is no such thing as a diarrhœa from teething in a healthy child—the lymph bodies in the neighborhood will swell. Unless such a diarrhœa is soon stopped the irritation will continue, congestion, inflammation, and swelling of the glands will ensue, and the structure of these neighboring glands will be changed. When such an inflammation of the gland has lasted a long time and new tissue has been formed in it, it may or will remain unchanged and unalterable, no matter what you may do for it.

The same takes place about the lungs. Whenever a baby or adult has catarrh with some cough and mucous expectoration, the neighboring glands in the chest—bronchial or mediastinal—will swell, and unless such catarrh is broken up the swelling may go on until the glands are hardened or undergo other changes. Sometimes they will form abscesses and break up. Whenever there is in a child or in an adult, particularly in the young of the age with which you have to deal, a catarrh of the nasal mucous membrane, the glands about the neck will immediately swell. This swelling will pass off when the nasal catarrh passes off. When it lasts long, when it becomes a chronic catarrh, the swelling of the glands remains; they become hardened, they are no longer amenable to the effect of medicine or to external treatment; they may finally break down and form abscesses. While they are in this swelled condition the lymph current through them will be interrupted, and whatever is floating in it will there be caught and infect the gland. Moreover, the minute capillary blood-vessels are smaller in the glands than elsewhere, and microbes which are easily passed by capillaries elsewhere and finally thrown out of the system will be caught in the capillaries of the glands. In this way the glands around the neck, that were not primarily infected by disease-producing germs, may become the receptacles of disease. They may become tubercular when tubercle bacilli are floating in the general circulation (although they might have been carried off if the organs

had been healthy), and be caught in the slow circulation of the gland and there remain. From there the invasion of the whole body may take place. Thus you see that, often in a healthy family or in an otherwise healthy child, a nasal catarrh of some duration may furnish the first inroad of tubercular bacilli. This is particularly so in infectious diseases which affect the mucous membrane to a high degree—for instance, in measles or whooping cough. Measles and whooping cough are often the forerunnners of tuberculosis.

As long as the mucous membranes are in a healthy condition they may be covered with no end of foreign material, microbes included, with no danger to the individual whatsoever. There are, for instance, very few probably among us here that do not carry either bacilli of tuberculosis or bacilli of diphtheria in their noses and throats this very moment. As long as our mucous membranes are in a healthy condition the microbes will not be absorbed. As soon, however, as the membranes are no longer in that healthy condition, when the microscopical epithelia that cover the membrane are destroyed or altered or washed off, then those foreign guests, innocent up to that time, will creep into the sore tissues and the whole system will become affected. Thus it may even be that a healthy person, harboring the bacilli of diphtheria or tuberculosis, may infect other people though he has not been infected himself.

The infection of the glands of the neck does not depend on a morbid condition of the mucous membrane of the nose alone; the vast area of the mucous membrane extending down to the pharynx and upward to the nose may be affected. There is no mucous surface that is covered and penetrated with small lymph bodies to such an extent as that of these organs. The lymph bodies in the hind part of the nose form, when they grow, what has been called adenoids. They sometimes reach such a size as to obstruct nasal respiration, compel the patient to have the mouth open to breathe, and cause him to hear and to sleep with open mouth, increasing the danger of infection on account of the wide access given to microbes floating in the air. In that condition the night is the most dangerous time. Adenoids and the whole mucous membrane have frequently been found to be covered with tubercular bacilli, more so than perhaps the tonsils.

When the bacilli are absorbed, their next lodging-place is, as

I said, the neighboring glands. These glands about the neck form three tiers all the way down to the clavicle. From there the lymph current goes downward into the chest and into the axilla; thus the lymph bodies or so-called glands swell in the axilla and in the chest. These lymph bodies in the chest are in direct contact with the mucous membrane of the large windpipes, and in that way with the smaller windpipes and with the lungs. That is quite frequently the way in which bacilli and other virus enter the lungs. It is often the process in the adult and in the adolescent and in the growing child.

When you understand that, you see how important it is that the mucous membrane of the nose and of the mouth should be taken care of in the very young and in the growing child. A great many cases of tuberculosis, diphtheria, and other contagious and infectious diseases could be prevented if there were no diseased mucous membrane *greedy* after infecting material. That is why it should be a rule in every family where there is the slightest tendency to nasal and throat catarrh to irrigate the nose and the throat at least once a day, better twice a day, with warm water in which a very small dose of common table salt is dissolved. This so-called saline solution contains from six to seven parts of salt to one thousand of water. A good proportion for practical purposes is half a teaspoonful of table salt to a good tumblerful of warm water. Part of this should be filled into a common nasal cup, the head should be thrown back, and small quantities should be allowed to run down the nose into the throat. If it be swallowed there is no harm, but children will learn very rapidly how to bring up the salt water. In this way the mucous membranes are kept intact, and nobody can tell how many diseases are kept away by this very simple method. I can prove that it does have that effect, for you will invariably notice that whenever you have a catarrh of the nose, or even when you see a very severe case of diphtheria of the nose (one of the most dangerous forms of that disease), the large swellings of the neck will be reduced in a very short time by doing nothing whatever except following the rules just laid down. No medicine, no iodine, no mercury is required, simply the washing out —in an acute disease like diphtheria very often—every one or two hours. In common nasal catarrh, twice a day is sufficient to reduce from day to day, or even from hour to hour, the size

of the glands, *unless* it have lasted weeks or months. Sometimes, even when it has lasted weeks, and not infrequently when it has lasted months, the correct irrigation of the nose twice or three times a day will gradually, within a few weeks or a month, not only reduce, but remove, the swelling that had been annoying for many months or even a year. In this connection I may say that nothing but irrigations should be used under ordinary circumstances, and no injections. No syringes should be used unless ordered by the physician in very bad cases of diphtheria, where it is important to remove a great many of the accumulated membranes in as short a time as possible. I will add, too, as a practical rule, that sprays, which are so frequently used, are not so effective either in disease or in comparative health. The washing out of the nose can be better accomplished by irrigations than by merely spraying.

What I have thus far said would settle in your mind the question whether scrofula and tuberculosis are identical. They are not identical, but they may become so. Imagine the original catarrh of the nose and throat, brought on by exposure, a drenching rain, cold feet, drafts in a trolley car, exposure of the perspiring skin, met with bacilli which had been innocent tenants on the mucous membrane; then these tenants of the surface would enter through the open door, and a real infection would take place. In that case, not otherwise, the scrofula or the alleged scrofula of the glands would turn out to be tuberculosis. Thus wherever there are swelled glands, wherever there is "scrofula," there is not necessarily at the same time tuberculosis, but there is danger of tubercular invasion. Scrofula, when fully developed in a child, as observed by you, will show a number of symptoms that are not found, as a rule, in tuberculosis. You have sore eyes, sore ears, swollen lips, and nose; you have the glands, you have the eczema of the skin; if all that were always tuberculosis there would be no possibillity of recovery. The scrofulous disposition is widespread; it extends over the skin, over the mucous membrane, and may show itself even in the bones; it is characterized by the fact that whenever there is such an infection, whenever there is scrofulous irritation at least, it is *not apt to heal.* Scrofulous inflammation and ulceration are very obstinate. If all that were tuberculosis the patient would be doomed; but tuberculosis invades the body

primarily in a certain limited locality. It may remain in that locality; it may remain in the end of a bone, in a number of glands, in a small part of the lung, and there may heal up. In the beginning, therefore, scrofula is a widespread *general* disorder and in the beginning tuberculosis is a *local* disease. That is why on the autopsy table we frequently find tuberculosis in a body where it was not suspected at all. We find deposits, small or large nodules, particularly in the upper part of the lung, usually the right lung, that are cases either of dormant or of recovered tuberculosis. No such thing is found in scrofula. When scrofula heals, the whole body is changed for the better. When tuberculosis heals, it is found that it was a local disease.

The invasion of tuberculosis into the human body may take place by inhalation of the bacilli, or by feeding, with the exception of the rare cases in which the bacilli get into the circulation through sores on the skin—in chronic eczema, for instance—or through wounds. Thus it is that butchers may contract tuberculosis of the skin from diseased cattle, or through an abscess. Milk containing tubercle bacilli may infect the intestinal tract, or (while being swallowed) the lymph follicles of the throat, including the tonsils, and thereby on their downward course, the body. From either of these places the circulation of the blood or of the lymph, mainly the latter, may be invaded.

The famous Dr. Emil von Behring, the discoverer or rather inventor of the diphtheria antitoxin, proclaims that almost every tuberculosis case, at any age, originates in the milk of tubercular cows taken by the infant or child. In most cases, in his opinion, tuberculosis remains dormant for many years, and every case of tuberculosis in an adult is the result of infection by tuberculous milk, during infancy. That is a cruel exaggeration. But surely there are *many undoubted* cases of feeding milk of tuberculous cows that resulted in tuberculosis. My late friend Olivier, of Paris, has the following report: Thirteen schoolgirls in a Paris boarding-school were taken with tuberculosis. Six died. Some of them had the disease first in their bowels. The milk came from a tuberculous cow with a badly affected udder. Johne, a great veterinary anatomist, examined a cow that had the reputation of being the finest on a farm until she became emaciated and died. Indeed, on account of her splendid condition her milk had been selected by the farmer for

his own infant. The child died of tuberculosis at the age of two years and a half. A case like this proves, besides other things, the correctness of my teaching these more than forty years, that it is always safer to select milk from a herd of cows than from a single cow, thereby diluting possible dangers. By experiment it has been proven that the milk of a tubercular cow when mixed with forty times the amount of healthy milk becomes devoid of dangers.

But, after all, cases of tuberculosis resulting from the ingestion of tuberculous milk are rare. In the stomach bacilli do not thrive, and tuberculous ulcerations of the intestines are infrequent. Indeed, the abdominal glands are more often affected than the mucous membranes of the intestines. The principal mode of entrance of tuberculosis is that of inhalation, which may be twofold: either that of the dry bacilli contained in the dust of the street, or of a room or public place; or of the moist particles of expectoration which are thrown about in a coughing spell and float in the air of a room hours before they are deposited on the floor. As far as the dry bacilli are concerned, it may take time and some force to remove them. A moderate air current is not sufficient for that purpose. Wherever they are deposited they are waiting for their chance. Dusting, sweeping of the dry material, will fill the air with bacilli. Children's respiratory organs, being nearer the floor than those of the adults, are most exposed. That is why the percentage of tubercular school children grows in disproportionate rapidity with every year of their lives.

Now, it may be worth your while to consider the final location of the inhaled bacilli; do they reach the finest ramifications of the bronchial tubes and the air cells? It is not probable, for in the advanced child and the adult the primary location of tuberculosis is not at all, or very rarely, in these distant parts. It is much more probable that during inhalation the dangerous inhalation is deposited in the posterior part of the nose and in the throat. There are those, however, who attribute to the tonsils the principal, aye, even the only rôle in the invasion of tubercle bacilli. A late author goes so far as to build his plan of preventing or combating tuberculosis on the total excision of the tonsils. That is an exaggeration. He claims the operation must be made according to a certain method, and, unfor-

tunately, he suggests that there are but few except himself who can perform it so as to be effective. Moreover, it is not true that the tonsil absorbs as readily as the other thousand of lymph follicles of the nose and throat. In my studies on diphtheria, before and in 1874 and in 1880, I found that when the tonsil alone was affected, the case was a mild one, and not accompanied by much swelling of the neighboring glands; that these latter swelled principally when the diphtheritic membrane reached beyond the tonsil; and that when the mucous membrane of the nose was the seat of the diphtheritic membrane, the case was so grave that before those times and before the suggestion of local treatment, every case of nasal diphtheria was pronounced fatal by a great French authority of that period, Roger. I showed that the reason for the relative innocuousness of the tonsil is anatomical. Though its structure is similar to that of the smaller lymph follicles disseminated in the neighborhood, it is surrounded by a firm fibrous membrane which, to a certain extent, shields the system against a rapid absorption of poisonous substances which have entered the tonsils.

Other modes of entrance of bacilli into the system are the following. The finger nails of babies, like those of adults, are unclean. Though they do not exhibit the unappetizing spectacle of a mourning ring, they are always unclean and harbor microbes, both uninjurious and injurious. A few years ago there was a report of a New York mother whose cheek was slightly scratched by her playful baby. The baby had erysipelas microbes under its nails, and the mother died of erysipelas. Thirty years ago I lost a warm friend, a great physician, who, while in quiet thought, scratched a small pimple on his cheek. His erysipelas originated in that very spot. Two German authors (Preisnitz and Schutz) published in 1902 their observations on the finger nails of children of from six months to two years of age. They proved that fourteen out of sixty-six had tubercle bacilli under their finger nails. No fixed star is more immovable than the fact that every one of these young ones had their dangerous pretty fingers in their noses and mouths. Now, tuberculosis will rarely make its appearance suddenly. Years may pass before the invalid lymph glands of the throat and neck give up their captive microbes and allow them to travel downwards. That is the time when your pupils develop

their tuberculosis, no matter whether they imported it from the flying dust of the street or the dry sweeping of the rooms, from their own nails, from the crumbs they picked up, or from their intimate comrades, the toys.

Now, ladies and gentlemen, I have repeatedly spoken of the fact that microbes, no matter in what numbers, may invade the nose and throat and are devoid of danger as long as the mucous membrane covered by them is healthy, but that they prove, or may prove, dangerous when a catarrh destroys the fine film of epithelia which protects the surface. That is why a cold is always enumerated amongst the causes of tuberculosis, of diphtheria, of rheumatism, even of erysipelas or of scarlatina. As practical people and bent upon caring for yourselves and others, you will ask me for the methods of keeping the mucous membranes in a sound condition, and thus preventing disease. That can be done by attending to the general health, and mainly by the hardening process.

Much has been said about *hardening*. What does it mean? Nothing but this: that the resistance of the child to the effect of external influences should be strengthened. Is there a uniform method applicable to every child, no matter of what age or constitution? Certainly not. But there is one object which should be accomplished in every infant and child, viz., the invigoration of external circulation. The surface of a child from two to ten years measures from three to ten square feet. In and under that surface there is a lake of blood. In vigorous health this blood is in constant and rapid circulation; within two minutes it enters and leaves the surface, comes from and leaves the center of circulation—the heart. Slow circulation in the surface retards the flow of blood in the whole body, and impairs the nutrition of the heart and every organ, causing congestion and insufficient function, and disease. Rapid circulation in and under the skin, causing rapid circulation everywhere, propels the totality of the blood in the child's body (from two to six pounds according to age—from two to twelve years) into and through the lungs, in which the contact with and the absorption of the oxygen of the atmosphere take place. Now, the best stimulant of the circulation in general is, besides muscular exertion (exercise), the stimulation of the skin by cold water and friction. A child of two or three years should have a daily

cold wash, either after a warm bath, or standing in warm water which covers the feet, or lying on the attendant's lap, or on a mattress. A brisk rubbing with a wet towel one or two minutes, and with a dry towel until the surface is dry and warm, is sufficient. Older children may have a wet sponge squeezed out over them, this procedure being followed by the same effective friction; or they may plunge into cold water, in the winter a single moment, in the summer several minutes. While in any bath, the skin should be thoroughly rubbed.

This rule must not become a routine applicable to every individual. Cold water and friction require a healthy heart and a certain degree of strength. A usually healthy child, when taken sick or when convalescent from a disease, lacks the necessary vigor, and the routine must be interrupted. A child under size and under weight requires warmer water and friction. That is why a newly born baby or an infant of less than one or two years should be spared a low temperature. This is also why a child whose feet, after a bath or washing, do not get so warm as the rest of the body should be rubbed down, not with cold, but with warm water, or with a mixture of alcohol and warm water in which table salt or sea salt has been dissolved.

It would be wrong, however, to rely on a single method alone for the purpose of preserving the healthy condition of the skin, the mucous membrane, or the general circulation. Whatever aids or injures one part of the body is apt to aid or injure all. No child can have a normal circulation in the chest when the abdominal organs are compressed or their circulation interfered with. Children, for instance, who suffer from constipation, no matter from what cause—I have described one form which results from an abnormal length and bending upon itself of the lower end of the large intestines,—or others who suffer from prolonged sitting, or those who bend over on account of near-sightedness, all compress their abdominal blood-vessels, and are often afflicted with nose bleeding, congestive headaches, and general ill-nutrition. That is one of the frequent occurrences which necessitate the watchful care of a school physician and of the teacher.

Physicians and humanitarians have always protested against premature schooling, too long hours, and too short recesses, and objected to overcrowding of the curriculum, and to the vanity

of incompetent schoolmasters and mistresses, who utilize the poor victims in behalf of exhibitions. Mostly in vain thus far. In regard to the exhibitions, and the examinations preceding them, I am sure Dr. Weir Mitchell has struck a keynote. Only last week in a public lecture delivered in Philadelphia, he expressed himself strongly in regard to the influences exerted by the worry and fear and over-exertion connected with school examinations. It is true enough that without some sort of examination the standing of the pupils in large schools is hard to determine, but, on the other hand, whoever has seen much of children or young people about the time of examinations must be fully satisfied that some modification or other must be discovered.

Now, as to school hours. A child of seven or nine years should not have more than two or three hours daily in school, one of which should be spared for an intermediate recess. From nine to twelve years the school hours should be three or four; after that age, not more than five hours, with frequent and ample recesses. The best exercise during the recesses is play in the open air. Compulsory gymnastics in badly ventilated localities cannot take its place successfully and may add to exhaustion and ill-health. It is an unfortunate fact that, when the claims of physical development were urged upon school authorities, gymnastics were added to the overcrowded curriculum as a matter of business interest or of conviction, not always willingly or intelligently.

The summer vacations of school children ought to be four weeks longer than they are. The public schools ought to be closed about the middle of June and reopened in October. Many years ago the Harlem Medical Association and the Medical Society of the County of New York requested the Board of Education of the city to open the public schools on the *third* in place of the *first* Monday in September. The soundness of the principle was appreciated and the necessity for such a change was acknowledged by the authorities, and the *second* Monday of September was selected for the beginning of the school season, so as to afford the children an extra week's broiling in the city's sun, and an opportunity to lose, as they did formerly, the benefit derived from the summer vacation. The sanitary reason of this loss of a beneficent opportunity was said to be the ana-

chronistic conviction of an eighteenth-century school superintendent, who said he preferred the influence of the schoolroom to that of the New York streets for the New York boy.

Teachers are principally concerned with questions connected with the condition of the school buildings. They should be ample and sunny and not moist; they should be exposed to fresh air, have ample light and sufficiently large rooms. All that appears to be understood, but in this very New York we know that not everything is done that could or should be done in regard to all these postulates. There should be ample light, not only for the purpose of being enabled to see the dust where it accumulates and the mud, but light is a remedy in itself. It is true that only in the last very few years has it been utilized for the direct cure of general and particularly of local diseases, but it was known previously that disease-giving microbes that live a long time in dark places will be speedily destroyed under the influence of light.

Air space should be ample. It is difficult to say exactly how many cubic feet are the proper supply. The amount of cubic feet in a schoolroom, which is occupied a number of hours only, need not be what it is in a living room, in a bedroom or in a hospital. In the latter more than 1000 cubic feet for a person is the least that should be demanded. We all know that there are very few persons, comparatively speaking, in New York, with its immense tenement-house population, that have as much air supply as that, but we all know how their health suffers from that reason. A schoolroom that is occupied only a short time may perhaps furnish about 200 cubic feet for a child. A room of 30 by 25 feet and 12 feet high, containing 9000 cubic feet of air, should not harbor more than 50 children. At best that would give 180 cubic feet for each child. I have known of a schoolroom, indeed, of many schoolrooms, that were meant for 60 children and contained for a long time an excess of 130. It is natural that a good deal of sickness must be the result among teachers and pupils.

Everybody is theoretically convinced that the blood cannot be fully aërated, and that the health must suffer, unless the air we inhale is pure. The young organism suffers in this respect more than the old, for it requires more oxygen, comparatively. Unless a sufficient supply of oxygen is kept up and

the percentage of carbonic acid contained in the air is below seven-tenths of one per cent. good health is impossible. The deteriorations you have to fight in the air of your schoolrooms are as follows. It is too dry under the influence of our heating apparatus. Furnaces and most other heaters furnish a dry air which impairs the surface of the mucous membranes in the nose, the throat, and the lungs. There is no more voracious oxygen eater than the gas stove. Carbonoxid is the result of imperfect combustion, and a very frequent deadly poison. So are the chlorine gas and the nitric and sulphuric acid contained in our coal supply. They are liable to change former health resorts, on account of the increase of factory chimneys, into questionable or dangerous localities. Add to this—and you cannot exclude them—the dust of the houses and streets with all it contains, particles of stones, metals, vegetable remnants, and microbes, and, further, the poisonous exhalations of the skin and intestines such as sulphides, and you will no longer wonder why there are so many cases of catarrh, bronchitis, pneumonia, infectious fever, and tuberculosis.

The heating should be considered one of the most important factors of health or disease. The first requirement of a good heating apparatus is to give no dust and not to render the air more dry than it naturally is. Our wind in New York is mostly west wind, that deposits all the moisture before it reaches us. That is why, as a rule, our air is very dry; that is why our buildings dry out so rapidly that they may be inhabited as soon as finished, and our linen, exposed to the air, dries in a few hours; and that is why our heating apparatus should supply us with a certain amount of vapor. Our furnaces furnish a dry heat; so does most of our steam heating. The result is frequent catarrhs. The temperature of a schoolroom in dry weather should be about 64 degrees, in wet weather about 68. I have been in many schoolrooms that are surely overheated. In order to modify the heat windows were opened. The children sitting under or near these windows contract in a great many instances a catarrh, and even pneumonia, and I have seen them die from such exposure. Perhaps it is too much to expect circumspection and mature judgment from a young teacher. But there should be no such thing as a really immature teacher. We are learning from our predecessors, the rules of hygiene are

well understood, and the people have a right to expect they should be known and obeyed. In that respect, as in many others, a schoolroom and a school building, like a hospital, should be models for the whole population, but not dangers. The halls of a school building should be slightly cooler, but slightly only, than the schoolrooms, in order to avoid drafts and a sudden change of the temperature.

If what I have brought before you was partially known to you all, it is a source of gratification to me. The main points connected with the origin and prevention of disease should be known to every educated person. Only in this way the public at large, which has to rely on superior judgment and is unfortunately more readily led astray than guided correctly, can be benefited. We doctors are never more pleased than when our patients understand the why and wherefore, in the same way that you are most enchanted with pupils that ask for and comprehend the why and wherefore. Unfortunately no walk of life is proof against ignorance. Moreover, our education is too often an instruction which runs in ruts. Nothing is more common than that men and women of good minds and moral instincts should be satisfied or compelled, by lack of time or opportunities, to neglect widening the horizon of their mental possessions beyond what is nearest to their profession or inclinations. That is why thousands in our better classes are so often the victims of quackery and sectarianism, of faith cures, clairvoyance, and un-Christian "science." Faith belongs to the realm of religion, not of science—of the other, not of this world. Now, the professions of doctor and teacher are least apt to be caught by glittering improbabilities or impossibilities. We teach the realities of both the physical and the intellectual world. That is why it has given me intense pleasure to speak before you, though well aware that in a brief time I could present to you but little that is foreign to you, or too little of what you had a right to expect. In what I have said there may be, however, a few practical points of value. In your professional work, and in your social contact with the little and the big ones, you will have ample opportunity, I hope, to put them into effect.

THE CARE OF THE EYES OF CHILDREN WHILE AT SCHOOL

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It has been said that "four-fifths of all our knowledge is acquired through the special sense of vision," and it might be said that the application of the knowledge thus acquired depends to a like degree on the integrity of that special sense. Recognizing these facts, it becomes easier to appreciate the value of vision and to realize the importance of maintaining the organ of vision in the highest state of efficiency possible.

The years of school life are years of physical development. The hours spent in the schoolroom are not spent in the manner best suited for the proper development of the body, and, if the conditions are not made as favorable as possible, physical degeneracy may result. This is true not only for the body as a whole, but also for the various parts of the body, and under certain conditions certain parts of the body suffer more than others. Under certain untoward conditions, the organ most valuable in the acquirement of knowledge—the eye—is most affected, and it is for the purpose of giving some idea of methods of guarding against the degeneration of this organ that this article is written.

Myopia.—The physical degeneration of the eye that is encountered in school children and that is much increased under favorable circumstances is near-sightedness (myopia). At or shortly after birth infants are almost without exception far-sighted (hypermetropic); a very few have normal refraction (emmetropia), and perhaps 1 per cent. are near-sighted (myopic). By the careful examination of the eyes of uncivilized and of civilized races, it has been shown that the uncivilized maintain to a high degree the hypermetropic and emmetropic eye, very few being myopic. In the civilized races, it has been found that the percentage of myopia steadily increases from the first year of life to the years of early adult life. The eyes of many thousands of school-children of different ages and of college students have been examined, and the percentage of near-sightedness at different periods of life determined. Risley, in examining the

eyes of children in the schools of Philadelphia, found that at the age of 8½ years 88.11 per cent. were hypermetropic, 7.01 per cent. were emmetropic, and 4.57 per cent. were myopic. At the age of 17½ years 66.84 per cent. were hypermetropic, 12.28 per cent. were emmetropic, and 19.33 per cent. were myopic.

In Cohen's statistics the following progression in the percentage of myopia was shown in the various schools examined by him:

5 village schools	1.4 per cent.
20 elementary schools	6.7 " "
2 intermediate schools	10.3 " "
2 classical secondary schools	26.2 " "
Among the students of the university	59.5 " "

He concludes that not only does the number of short-sighted pupils increase from the lowest to the highest schools, but that the increase is in direct proportion to the length of time devoted to the strain of school life. It will be seen by this that the development of myopia is due largely to the demands of civilization.

Significance of Myopia.—It is not necessary to enter into an extensive argument for the purpose of showing that the development of myopia is undesirable. The facts relative to this have been reviewed too many times. (For a comprehensive discussion of the subject, see Norris and Oliver's *System of Diseases of the Eye*, vol. ii., p. 358.) Suffice it to say that progressive increase in the refraction of the eye—the development of myopia—is injurious, and is in at least 80 per cent. of the cases attended by changes in the interior of the eye that are clearly pathological. That careful observer, Donders, taught that "every short-sighted eye is a diseased eye. . . . Progressive short-sight is in every case ominous of evil for the future, for if it remains progressive the eye soon develops painful symptoms and becomes less equal to its work, and not infrequently at the age of 50 or 60, if not much earlier, the power of sight, either from detachment of the retina or from atrophy and degeneration of the yellow spot, is irrecoverably lost."

"If we regard increasing refraction in the human eye as a manifestation of disease, the figures in the school statistics

acquire a vital significance when viewed from the standpoint of school hygiene."—Risley.

As to the time of the development of myopia, it is well known that such development often begins as soon as the individual commences to exercise the functions of accommodation and convergence—in other words, to regard small objects closely (from 3 to 10 years of age), and, as a rule, advances until the individual is 22 to 27 years of age, when, except in the more malignant cases, the increase in the myopia ceases.

Causes which Predispose to the Development of Myopia.—In this list we may place first inherited tendencies, aside from errors of refraction. Myopia itself is seldom inherited, as may be easily proven by referring to the statistics regarding the refraction of very young children. Risley gives only 4.27 per cent. of myopia in children of 8½ years, and it is an accepted fact that not more than 1 or 2 per cent. of children are myopic at birth. However, the researches of Pflüger (*Zeitschrift Schulgesundheitflege*, 1889, No. 5) show that myopic parents have 15 per cent. more myopic children than do those without myopia. Von Hippel states that 59.5 per cent. of myopic pupils have myopic parents. Motai, who examined parents as well as children, found that in 65 per cent. of the cases one or both parents of myopes were near-sighted. The tendency to near-sightedness probably consists in a condition of the sclera which permits it to expand under stress of use of the eyes for close work plus intraocular tension. A second predisposing cause, and one of much importance, is uncorrected astigmatism. Astigmatism of whatever variety, if uncorrected, necessitates the expenditure of more muscular effort in the attempt to see distinctly than is necessary when the refraction is normal. This is accompanied by early fatigue and more or less congestion of the vascular tunics of the eye, with increase of intraocular as well as extraocular secretions. The result is that eyes with astigmatism, whose scleræ are not particularly rigid, are apt to expand, producing enlargement of the globe with consequent myopia. Opacities of the cornea, lens, or vitreous humor constitute a third predisposing cause. The effort to see small figures or objects more distinctly entails a strain on the eyes which may result in myopia.

Since it is a fact that the development of myopia takes place

when the eyes are used to any great degree for regarding small objects, particularly when the conditions under which they are employed are unfavorable, and since school work entails the almost constant use of the eyes for this purpose during school hours, it becomes the duty of the managers of schools to see that the eyes are used under the most favorable circumstances.

Examination of the Eyes.—To determine the fitness of children to undertake school work, every individual before being accepted as a pupil in any school should have the eyes examined by a competent medical man, and one of the requirements for admission should be a statement from the physician setting forth the fact that the eyes have been examined and that the pupil can safely use his eyes for close work. Should this requirement not be in force, an examination of the eyes should be made by a teacher who has been properly instructed in this duty. The equipment for this work is simple and inexpensive. Charts of test-type for distance and for near vision, constructed after the principles laid down by Snellen, should be procured. A metre rule is also desirable. The test-type referred to are of different sizes and are made to be read at different distances by the normal eye. The distance at which each line of letters should be read is indicated on the card either in metres or in feet. Charts for testing distance vision should be placed at a distance of twenty feet from the pupil, and should be well illuminated, preferably by daylight. Each eye should be tested separately. In designating the visual acuteness of an individual, the number of the line is used as the denominator of the fraction, the distance at which the line is read, as the numerator. Thus, if the line that should be read at 20 feet is read at 20 feet, the fraction is $\frac{20}{20}$. This equals normal vision for distance. If the line that should be read at 40 feet can be read at 20 feet only, the fraction is $\frac{20}{40}$, indicating that the vision is below the normal. In tests of near vision, not only must the degree of vision be determined, but the nearest point at which the smaller letters can be seen—the so-called punctum proximum (p.p.)—should also be determined. A table of the normal near point (p.p.) is appended.[1]

[1] Distance of the near point (punctum proximum) from the eye at different ages with normal refraction.

AMPLITUDE OF ACCOMMODATION
(after Donders)

Year.....	10	15	20	25	30	40	50	60	70	75
English inches..	2.8	3.27	3.94	4.65	5.63	8.74	15.75	39.37	157.48	∞

In children who have not been taught the alphabet, the examination may be conducted by means of Snellen's chart for illiterates. This is better than to wait until familiarity with the alphabet is acquired, particularly in those who have reached the school age, as it may occur that the backwardness is due to a defect of vision.

In all cases in which the visual acuity is found to be below the normal (pupil not able to read the 6-metre line at 6 feet—20-feet line at 20 feet, either with one or both eyes), and in cases in which the near point (p.p.) is at a greater distance than it should be, the attention of the parents or guardian should be called to the matter and the advisability of the proper examination urged. It will be found that glasses are required in the greater number of cases, but in some cases opacities of the cornea or disease of the interior of the eye is the cause of the impaired vision. In cases of this nature glasses will not bring the vision up to normal. Such a pupil should be favorably seated in the schoolroom in order that he may pursue his studies without being placed at a disadvantage as compared with his fellows whose vision is normal.

Non-inflammatory Defects.—There are other non-inflammatory defects of the eyes which render their use painful and at times almost impossible for near work, of which the teacher should have some knowledge and also be able to recognize the symptoms produced. These are chiefly due to hypermetropia and astigmatism of moderate degree which do not reduce the acuity of vision, and to anomalies of the muscles. The principal symptom produced is headache, which may affect any part of the head. Twitchings of the facial muscles simulating chorea, restlessness on attempts at study, and somnolence are symptoms that are sometimes present. If these symptoms occur with some degree of constancy in a pupil, the teacher should notify the

parents of the fact and suggest inquiry regarding the cause. The inquiry should not omit an examination of the eyes.

Color-blindness should be detected while the child is at school in order that a career which would be hampered because of this defect may not be chosen. As a rule about 4 per cent. of males and ½ per cent. of females are color-blind. In the schools of Antwerp 3.78 per cent. of boys and 0.72 per cent. of girls were color-blind. A simple test for the condition and one that is sufficiently exact to be employed in schools is by means of Holmgren's worsteds. A hundred or more small skeins of colors of all shades are supplied. These are dumped in a pile on a table, and the child is told either to match a certain test skein or to select all of the shades of one color. Color-blindness is seldom complete. When it is, the various colors appear to be some shade of gray. The part of the color-sense that is most often deficient is that for green and red. Because of this the test skeins found in Holmgren's methods are bright green and rose-red. The green skein is given to the pupil and he is asked to match it from the pile of smaller skeins. After this test is made, the rose-colored skein is tried in a similar manner. The pupil may be requested to select the various shades of a color. Failure to select the reds or greens properly may be followed by similar tests with yellow and blue.

Care of Eyes in Schoolroom.— For the proper care of the eyes after the child has entered the school, certain conditions should be observed. The work of the pupil while in the schoolroom should be accomplished under conditions favorable to the use of the eyes. These conditions are considered under their proper headings, as follows:

Proper Lighting of the Schoolroom.— It should be possible to read diamond type at ten inches from the eye in any part of the schoolroom. The most desirable light is daylight. This should come from skylights or relatively high windows on the left side and slightly to the back of the pupil, the windows on the side not extending forward beyond the front row of desks. The windows should not reach the floor by at least 3½ feet. Windows at the back of the pupils are permissible, but are not the most desirable. The light should come from the left and above in order that the point of the pen and the written characters may not be in shadow; it should be slightly to the rear of

the pupil in order that the light may not fall on the eyes, but will fully illuminate the printed or written page. The area of glass should not be less than one fourth of the floor space, and the room should not be wider than twice the height of the sash space in the side windows when the lighting is from the side. If the light is partly shut out by adjacent buildings, trees, or other objects, the loss should be compensated for in some manner.

No source of bright light should be permitted to remain in front of the pupil unless it be sufficiently high to be virtually out of the field of vision. If artificial light is used, it should be a steady light arranged above the pupils, preferably in the ceiling, and should be controlled by suitable reflectors. If table or desk lights are used, they must be properly shaded from the eyes. Incandescent electric light is the best, as it does not increase the heat of the room appreciably, does not consume oxygen, or pour out the products of combustion into the atmosphere of the room.

The illumination of a room also depends largely on the color of its walls. These should be finished in light colors, preferably light buff or pale yellow, with window-shades to match. Very light greens, blues, or grays may be employed. The woodwork should also be light in color. Blackboards should be placed opposite the windows and should not be of larger area than is necessary, because of the absorption of light. If the illumination is not ample without it, blackboards should be covered when not in use by shades to match the tint of the walls.

Seating.—Proper seating is desirable to facilitate the easy use of the eyes. The seats and desks should be independently adjustable, so that the requirements of the individual pupil for correct seating can be met. The seat should be level and slightly concave. It should be as wide as the thigh is long, measuring from the posterior bend of the knee, and should be just high enough to permit the soles of the feet to rest on the floor.

The desk should slant toward the pupil, forming an angle of 10° with the horizontal plane, and should project over the edge of the seat from 1 to 1½ inches. (This is known as the "minus distance" in contradistinction to the position in which the edge of the desk is in front of the edge of the seat, the "plus distance.") The top of the desk should be sufficiently high to permit the forearm of the pupil to rest lightly upon it when he

is sitting upright and is in position for writing. Seats that are too high and desks that are too low and in the plus position, necessitate leaning forward for writing and study with the book on the desk. Seats that are too low and desks that are too high cause the body to be tilted backward and the shoulders to be pushed upward when desk work is being done. These two conditions are faulty. The seat and desk should be so adjusted that it will be easier for the pupil to sit upright than in any other position, particularly when doing any work at the desk. If the minus distance of the desk interferes with the change from the sitting to the standing posture, the desk should be so constructed that it may be readily shifted.

Size and Form of Letters.—The development of easy binocular single vision for the reading distance advances slowly in the child. The sense which causes the images of the two eyes to blend into one, the so-called fusion sense, is apparently not fully acquired until the child has reached the age of 7 to 10 years. The power of accommodation, although of great amplitude, is not sufficiently easily employed to enable the child to obtain clear images of small objects continuously for any considerable period of time. In other words, fatigue of the eye-muscles soon takes place. The work required of them should not tax them unduly. For this reason the characters and appliances employed in teaching should be sufficiently large and sufficiently individualized to be easily seen. In the primary department the size of type should not be less than 4 mm. in height, with the spacing in proportion. The "face" of the type should be bold. The size of the type used in printing the books for the different grades may be gradually reduced until the minimum type is reached. This, according to Cohn, should not be less than 1.5 mm. in height for small "n" (corresponding to "long primer"), and "bold-faced" type should be employed. The space between the lines should be 2.5 mm. when this type is used. Proper spacing, as well as proper "leading," must be insisted on. Books printed in this type may be put into the hands of the pupil who has passed the age of 13 years.

Length of Line.—The length of the printed line should not be much more than 10 cm., nor much less than 7 cm. If the line is too long, the effort required to find the succeeding line is too great. If the line is too short, the lateral movements of the

eyes are so frequent that the muscles concerned in these movements soon become fatigued. The printed line on the ordinary quarto page is too long.

Paper.—This should be opaque and non-bibulous, so that the impressions on either side will not show through, and the sheet should be on an unyielding surface when printed, in order to avoid embossing. The surface should not be polished or glazed, but should be "mat" in order to avoid so far as possible the disturbances of vision due to irradiation and irregular reflection. The color of paper most agreeable to the eye is white or a *very light* cream color.

All text-books, before being accepted for use in schools, should be passed upon by one familiar with the requirements for easy vision.

Maps.—Wall-maps and charts are very desirable as a means of teaching, provided they are properly made. They should be in white and black; or in the lighter shades of color, particularly of yellow, for the groundwork, with lettering and prominent features in black. Black letters placed on dark fields of whatever color are difficult to recognize and entail undue effort on the part of the eye. The type used should correspond in size to that on the test charts of Snellen, designed to be read at the distance of the map from the farthest pupil. Ordinarily, the size of the Snellen type designed to be read at 40 feet may be employed.

Hand atlases in which the names of places, rivers, etc., are printed in small type on dark-colored fields are extremely trying to the eyes.

Blackboards are valuable as a means of teaching, but the surface should not be permitted to become gray. The surface should be washed before the daily school session begins, and chalk-marks not required should be carefully erased. When the board is in use, the characters employed should be sufficiently large to be plainly seen from distant parts of the room.

Writing.—White on a black field or black on a white field should be employed, and the contrast should be as decided as possible. Professor Horner found that ink-made letters on white paper sufficiently large to be seen distinctly at 211 cm. could be distinguished only at 183 cm. when made with a lead-pencil, and only at 159 cm. when made with a slate-pencil on a

slate-colored surface. "That is to say, an eye that can read ink-made letters of a given size at 12 inches (.33 metre) would be compelled to bring them to 9 inches (.23 metre) in order to see them if made on a gray-black slate with a slate-pencil, thus causing greatly increased strain upon the accommodation and convergence."

For desk-work, white paper, black ink (not the pale ink that becomes black on exposure), and a pen that makes a line not less than $\frac{1}{3}$ mm. in width and fairly uniform should be employed. A carbon pencil and white paper may be used, but are not so desirable. Ordinary slates should be abolished for school-work. The white slate with a black pencil is permissible, but is not so good as the paper and ink.

The characters used in writing should depend to some degree on the position of the pupil and the position of the paper. The letters should not be less than 3 mm. in height, and the stroke should be bold and uniform. The principal point to bear in mind is that the vertical strokes should correspond with the vertical meridian of the cornea. If the paper is placed on the desk at an angle of 30° to the left and the pupil sits in the upright position, the slanting script will meet this requirement. If the paper is placed at right angles with the edge of the desk, the vertical script should be employed. An argument in favor of the vertical script is that when the page is read it is naturally held about at right angles with the vertical plane of the body, in which position the principal strokes of the slanting script would lean to the right 20° to 30°. Something in the general inclination of the script, the so-called individuality of chirography, can be left to the pupil, but it is just as easy to induce him to form a habit of writing that will result in the acquisition of a legible "hand" as to permit him to acquire a "hand" that is not legible. In my opinion the vertical script should be taught.

In regard to the position of the pupil in writing, probably sufficient has been said. If the seat and desk are arranged as suggested on page 36, the upright position will be assumed, and the paper should be at least 12 inches from the face. Children as a rule tend to approach the face close to the page from which they are reading or on which they are writing. This is undoubtedly due largely to the fact that they are not very familiar

with the characters and desire to produce as large a retinal image as possible. The position imposes much unnecessary work on the muscles of accommodation and of convergence, and this tends to the production of myopia. The inclination should be combated by supplying books with large, legible type, and requiring the child to make characters in writing that are large and distinct.

Drawing.—Drawing should not be taught before the age of 10 years, and even then very fine lines should not be employed. In drawing or tracing, the contrast between the ground-color and the color applied should be strong, and the lines should be as bold as possible. Mechanical drawing is very trying to the eyes. It should be done under the best conditions regarding light, character of materials, and position of work, and only after the correction of any error of refraction that the pupil may possess.

Hours.—The school-day in the primary department should not exceed three hours; in the higher grades, the time may be increased without injury to the eyes. The hours now required are not in my opinion excessive.

In regard to study-hours, in the lower grades the time should be short, 15 to 20 minutes; there should then be some form of interruption for the same or a longer period, when the study may be resumed. The length of the study-hour may be increased as the grade ascends. Pupils under the age of 12 or 13 years should not be requested to study outside of school-hours. When older, under careful guidance more may be attempted.

Kindergarten.—In regard to the kindergarten as now generally conducted, it may be said with truth that, so far as the eyes of the child are concerned, the conditions are fully as favorable and in many ways much more favorable in the kindergarten than out of it. The use of the eyes under the guidance of intelligent teachers is often accompanied by less strain than when the child is at home in the care of the mother or nurse. The acquisition of knowledge by playing what to the child are interesting games, listening to pleasing and instructive stories, singing nursery rhymes, practicing manual training by the use of coarse materials, making simple pictures in the sand, or on paper with charcoal, studying simple pictures, and becoming familiar with figures and short simple words from books printed

distinctly and in large type—such employment, lasting from two to three hours daily, cannot but improve the child physically as well as mentally, providing the hygienic condition of the rooms is desirable. In an experience of twenty years in the practice of ophthalmology I have never seen a child whose eyes could be said to have been injured by kindergarten work.

All kindergartners should know that the accommodative power and the fusion sense are being developed in children of kindergarten age, and that use of the eyes for close work should be avoided. Sewing with fine thread, using small beads or fine wire, working on finely-ruled paper, fine weaving, or anything of a similar character must be expunged from the school.

Contagion.—The contagious diseases of the eye that affect school children are diseases of the mucous membrane of the eyelids, eyeball, and conjunctiva, designated by the term conjunctivitis. Of the various forms of conjunctivitis that affect the eyes of school children, the one most to be dreaded is trachoma (granular conjunctivitis, granular lids). This affection comes on slowly, is frequently unaccompanied by redness or secretion to any appreciable degree in its early stage, and may reach an advanced stage before the gross appearances are such that they would be noticed by one not experienced in observing diseases of the eye. Presence of secretion and interference with vision are sufficient to attract the attention of the teacher at once. There are other forms of eye disease very slightly contagious which the teacher might or might not recognize. Because of the insidious nature of some forms of eye disease, it is desirable to have the eyelids of all pupils examined or inspected at relatively short intervals—once every four to eight weeks—by a physician who is competent to detect any case of this kind. In the interval the teacher should make it a point to observe the eyes of pupils and to exclude from the school until recovery is complete all pupils whose eyes are inflamed and from which there is more or less discharge. Pupils so affected should not be permitted to return to school without bringing with them a statement from some competent physician, testifying to the complete absence of any contagious element in the case.

Acute inflammatory conjunctivitis develops rapidly, accompanied by swelling of the lids, redness of the mucous membrane of the eye, and the production of much mucopurulent secretion.

This form of conjunctivitis is frequently very contagious. The teacher should be quick to recognize it, and to send the pupil home at once with the recommendation that suitable treatment be sought without delay.

Inflammation of the margins of the lids, excessive blinking, and a tendency to shrink unduly from the light should also be noticed by the teacher. The attention of parents or those in control of the child should be called to the condition, and they should be requested to have proper advice regarding the matter.

The school should be conducted not only so that cases of eye disease may be detected when they develop, but also in such a manner that the development or spread of contagious eye disease will not occur. To this end the pupils should be taught not to wash in the same water that has been used by others, to have and to use their own towels and no others, and not to exchange handkerchiefs. It is advisable to teach pupils that inflammation of the eyes is as a rule contagious, and that they should keep away from individuals so afflicted. Opportune talks on the preventive measures that the pupil should observe in regard to contagious diseases of the eye should be given by the teacher or some one in authority sufficiently often to keep the subject before the pupil.

THE NUTRITION OF SCHOOL CHILDREN

By CHARLES GILMORE KERLEY, M.D., Professor of Diseases of Children, New York Polyclinic Medical School and Hospital; Attending Physician, New York Infant Asylum; Attending Physician for Children, Sydenham Hospital; Assistant Attending Physician, Babies' Hospital; Attending Physician, Out-Patient Department, Babies' Hospital, New York City

A feature of the child's life to which those professionally engaged in the education of the young could with advantage turn their attention is the child's physical development. This most vital part of the child's life has been neglected not only by teachers, but by parents and physicians as well. While the child is receiving instruction and his mind is being prepared for the future, the animal part—the body—is developing. How it is developing is oftentimes determined more by heredity and chance than by any effort on the part of those directly concerned in the child's welfare.

The child is a young animal, so far as his physical characteristics are concerned. In his work on Education, Herbert Spencer remarks that "the first requisite for success in life is to be a good animal; and to be a nation of good animals is the first condition of national prosperity." "Is it not an astonishing fact," he continues, "that though on the treatment of our offspring depend their life and death, their moral welfare or their ruin, yet not one word of instruction is ever given to those who will hereafter become parents?" The chief error made in the management of the child relates to his nutrition. If the child is properly fed, he will bear a great deal of abuse in other directions. For the growth and development of the young of the lower animals, as well as for the growth and development of the higher animal, man, there must be means of nutrition and surroundings suitable to the habits of the animal—conditions ordained by nature which, when not followed out, invariably produce inferior growth and physical degeneration. In order that a vigorous adult may be produced, suitable nutrition, plenty of fresh air, and cleanliness are necessary for the child. In his daily life there must be an absence of worry and anxiety, an absence of any great degree of responsibility, an absence of work of an arduous nature, until the adult period is reached.

The child must make its first year's growth and development during the first year; its second year's growth and development during the second year; and its third, fourth, and fifth, and later years of growth and development during those years. In order to make the best adult, both physically and mentally, every year of the growing period must supply its quota of physical and mental development. The child will never do its first or second year's growth satisfactorily during its fifth or sixth year; nor its fifth or sixth year's growing during its tenth or twelfth year.

Protracted faulty nutrition, over-work at school, employment of an arduous nature in mines, stores, or factories during the developing period leave their indelible stamp on the adult, as evidenced by stunted growth, lack of endurance, lack of capacity for work, together with the absence of a high order of mental capacity and moral force—conditions so often found in the weakly. Assuming that the object of a national existence is the creation and preservation of a fine stock of mankind, the necessity of proper management and suitable nutrition of children during the actively growing period becomes most apparent. Faulty nutrition produces lack of resistance to disease. It makes susceptible bodies. The large mortality among children is due, directly or indirectly, to nutritional errors more than to anything else. Scarlet fever, diphtheria, measles, pneumonia, tuberculosis, and the intestinal diseases claim most of their victims among those who have not sufficient stamina to resist the infection.

It is necessary for signal success in any business or calling that the individual should be physically strong. The struggle for existence is gradually becoming more acute: a struggle in which the strongest win and the weak are greatly handicapped. In many walks of life physical examination is now required before employment can be obtained. Business men, teachers, lawyers, clergymen, physicians, who are not physically strong can never attain the eminence of those who enjoy vigorous bodily health, for the reason that they do not possess the capacity for hard work. The employer in any competitive industry cannot afford to employ a man, or men, who cannot work to the standard set by the well and vigorous. Machinery must be manned by men who are equal to the task as estimated by the standard set by the strong. To be admitted to the Army or Navy, or to secure employment in many of the branches of

public service, a rigid physical examination must be satisfactorily passed. If success in life, happiness and usefulness depend to so great a degree upon a normal body, those who are immediately concerned in the care of the child should do their part in order that this normal body may be furnished him. It is well known that mental incompetency and physical weakness go hand in hand. The mentally defective who come under my care invariably are found to be suffering from gross physical defects. That a sound mind requires a sound body is a maxim that will be disputed by none who have had the care of many children.

The infant's weight increases about twenty times before the adult period is reached, and its body is built up by the food it assimilates. It requires no great process of reasoning to appreciate that the child fed on suitable food will become a more vigorous and better formed adult than the child which is fed, beginning at birth and continuing during the entire developmental period, on food of indifferent tissue-building qualities. The child requires nourishment not only to sustain the body in the performance of its functions—which is the case with the adult,—but he has also to furnish an extra amount of nutrition in order to supply the demands which the normal growth and increase in bodily weight necessitate. As growth and development take place in all parts of the body through cellular activity, the child's food must contain in large amount the nutritional elements which support cell reproduction. In the feeding of the lower animals the scientific farmer acts with a definite purpose in view. For the purpose of fattening he gives food which tends to produce fat. To the young and growing animal in which strength and endurance is the object, food is given which will tend to bring about this result. In the feeding of children this same definite purpose should be present in our minds and carried out in our daily lives. It should be our aim so to nourish the child that the strongest man or woman possible will be produced. It is a mistake in the nutrition of children to think no further than to satisfy the appetite three times a day. The child's appetite may be, and too often is, satisfied day after day with food comparatively indifferent in tissue-building qualities. The child does not suffer so far as the sense of hunger is concerned; but the body, not being supplied with what nature requires, suffers in retarded growth and faulty development.

All through the entire growing period, many children suffer from what might be considered a process of slow starvation on three full meals a day. When the child's food is habitually unsuitable, an adult physically inferior always, and mentally inferior usually, is produced.

Fats, protein, carbo-hydrates, and mineral matters or salts are the chief nutritional elements which need to be considered in the nutrition of children. Fat is a concentrated fuel which undergoes combustion, and its function is to supply heat and energy. Fat is best supplied to the child in the form of milk, which contains four per cent. of butter fat, and in butter used freely in the daily diet. The vegetable oils are unsuited for children because of their difficulty in digesting them. Carbohydrates are supplied in the form of starch, which by the process of digestion is converted into sugar. The function of the carbo-hydrate is, like the fat, to supply heat and energy. Vegetables, fruits, and particularly cereals, which supply the carbohydrates, contain other nutritional elements of much value. All of the cereals contain gluten or vegetable protein, iron, and various salts. Protein contains nitrogen, phosphorus, sulphur, carbon, hydrogen, and oxygen. Without nitrogen the cell growth and reproduction cannot take place. An animal fed on fat and starch alone will soon die of starvation. In the selection of the child's food it will readily be seen that protein is the most important element in his diet. The foods rich in protein from the animal world are milk, eggs, meat, fish, and poultry. Among the cereals oatmeal is the most desirable food for the child, in that it contains nearly twice as much protein as the other cereals. Dried peas, beans, and lentils are also desirable additions to the child's diet in that they contain a large amount of protein—eighteen to twenty per cent. Given in the form of a puree these legumins make a most valuable addition to the nourishment of a child of slow growth and tardy development. Fruit should form a portion of the daily food. Man requires a mixed diet, and fruits give variety. They supply salts and organic acids which are required for the normal performance of the bodily functions. They act as diuretics, laxatives, and cathartics. They are anti-scorbutic; they improve the digestion. Apples, pears, oranges, limes, and prunes are the best fruits for children. They are rich in the salts of lime, potash,

and magnesia—substances necessary for the formation of the bony parts. Nuts are rich in protein; but on account of their being difficult of digestion they are unsuitable for the diet of a child. The green vegetables, while not furnishing as much nutrition as the animal foods, cereals, and legumins, are, like fruits, necessary in that they give variety to the diet and supply needed salts and acids. The most suitable among the vegetables from the standpoint of digestibility and nutrition are potatoes, peas, beans, tomatoes, asparagus, and rhubarb.

Not only is it necessary that the child's food be carefully selected; but its preparation is equally important. Thorough cooking of the cereals and vegetables is most necessary. The cereals should be cooked at least three hours. It is oftentimes more convenient to cook them the day before they are wanted for use. When required they can be quickly warmed and served. The boxed breakfast foods should not be given to children, because their nutritional value is often sacrcified in making them easy to prepare and serve. The child thrives best on three meals daily, with an apple or an orange between meals if food is wanted at such times. For the proper performance of their functions the digestive organs require definite periods of rest. The child who eats between meals habitually may not show symptoms of active indigestion; he may not be ill; but he invariably suffers from faulty nutrition, imperfection digestion, and defective assimilation.

In order that the best adult may be produced, physical and mental development must go hand in hand. Excessive mental activity in school work retards and hinders later mental development in that it prevents the proper performance of the normal physical functions. Likewise, unsuitable food retards and permanently hinders normal mental development in that it produces a weakened and inferior body. The most carefully selected and prepared food will fail to nourish the body if there is excessive mental activity, for the reason that under such a condition the food cannot be properly assimilated. Excessive mental activity and worry, by preventing the proper assimilation of food, will result, equally with unsuitable food, in an insufficiently nourished body. And the poorly nourished and undeveloped body will in its turn retard and hinder mental development.

SCHOOL LUNCHEONS

By HELEN KINNE, Professor of Domestic Science, Teachers College

The practice of giving luncheons to school children in the school building is becoming common in our large cities. The necessity for this has arisen from conditions that make it impossible for children to go home at the proper hour, and also from the fact that food brought by the children themselves is often undesirable. The school luncheon originated in an attempt to furnish something, such as milk, cocoa, or soup, to supplement the luncheon brought from home. Where this experiment was tried the articles served were in demand immediately. From this unpretentious beginning has grown a more adequate luncheon, which in several instances meets the requirements of nutrition, and is on a paying basis.

It is the purpose of this paper to discuss practical conditions in the giving of school luncheons, to cite instances where these are more or less successful, and to make suggestions to those school committees who wish to introduce the luncheon or to improve the one already given.

The luncheon is a meal that should contain about one fourth of the whole day's ration. As it is taken usually under somewhat hurried conditions, and is followed by either mental or physical activity, the ideal luncheon consists of foods that tax the digestion as little as possible, while furnishing all the elements of nutrition. Heavy dishes and rich dishes in general should be omitted. Having stated this principle, it is at once necessary to show that it needs some modification; for while a sedentary individual may be satisfied with the lighter forms of food, a growing boy with a large appetite and good digestion demands something more substantial. For instance, baked beans and brown bread have proved to be popular with high school boys, who apparently have no difficulty in digesting them. Therefore food of this kind cannot be objected to on theoretic grounds, and may be included in the menu.

In planning a definite menu account must be taken of the home habits of the pupils, which are often undirected, and certain unaccountable likes and dislikes must be considered. It is not a difficult task to arrange menus to meet theoretic requirements, giving the proper balance to food principles, represented

in simple dishes. Even where there are differences in age and variations of normal appetite, these conditions can be met by making such a menu somewhat elastic. But while the ideal luncheon may be offered, it may not be acceptable until the pupils become educated to desire what they need. Observation and experience are required to determine what people will take, and ingenuity is necessary to ensure variety and attractiveness. It is often the case that not only the pupils themselves, but the teachers and students of maturity are served; and while the matter of supplies for the younger pupils may be controlled, it cannot so easily be for the others.

Another problem is that of a proper place for serving food; and if anything in the way of a hot luncheon is offered, space for keeping the food hot or for actual cooking must be provided. The question of service is one, also, that needs quite as much attention as the menu itself. The shortness of time allowed and the large number to be served make proper service difficult and increase the tendency to rapid eating which destroys the good effect of the most wholesome luncheon. Another element of difficulty is the fact that the luncheon must be upon a commercial basis. Expenses must be met, unless there is a special endowment for the purpose; and even then it would be poor economics to have the luncheon upon anything but a paying basis. While, in some instances, profit is not necessary, at least there should be no loss. The most important, and possibly the most serious element in the whole problem is the fact that it is absolutely necessary for best results to have at the head a person trained for the work, with a knowledge of the subject from a dietetic point of view, and with practical experience and business ability.

Taking up first the question of the menu, the following groups of dishes are suggested as desirable:

Soups.—Vegetable, with a milk basis.

Meat soups, containing some vegetables.

Oyster or clam.

Meats.—Where the luncheon is simple these may be served with the bread in sandwiches.

Where there is a demand, and proper facilities for preparation, a roast or some made dish can be given, as, for instance, minced chicken on toast.

Fish and shellfish; fish-balls; creamed fish; escalloped oysters.

Bread-stuffs.—Bread, brown and white, buttered; and sandwiches.

Vegetables.—Rice and macaroni are easy to serve.
A celery, lettuce, or cress salad will supply the green vegetable.

Sweets.—Puddings: custard, rice, tapioca, chocolate cornstarch, lemon jelly, etc.
Plain cakes and cookies.
Sweet chocolate.

Fruits.—Fresh fruits in season.
Stewed fruits, dried or canned.

Beverages.—Milk and cocoa.

All materials should be of good quality, and well cooked.

For variety, as in the home table, the person in charge must take pains to change the simplest menu. Certain staple articles may be served daily, but variety must be studied, and a part of the menu changed from day to day. This element of change cannot be emphasized too strongly. It is probably true that a successful caterer is one who understands the psychology of eating, and knows that monotony is to be avoided. Here, as at home, the menu should change with the seasons, from month to month, from week to week. And this change does not need to be a radical one always; often a change of flavoring, or even a change of form, has the desired effect. It will be seen that the menu may consist of a very few simple dishes, or may be increased until such a luncheon is served as is found in the ordinary public lunch-room.

In regard to the service, some plan has to be devised by which the pupils wait upon themselves as much as possible. Attempts have been made, in one or two instances, to have tables set with cloths and to provide waitresses. This adds very greatly to the expense and takes more time than can be given ordinarily. It is best to dispense with table-cloths and to make some arrangement by which the pupils help themselves to the food in part. The "tray" system, described further on, is one of the best.

The matter of time and crowding may be controlled, to a great extent, by serving different grades at regular hours; for instance, the lower elementary as early as 11 A.M.; the upper elementary, half an hour later, and so on. It is wise to appoint older students as monitors, to assist in keeping general orderliness; or teachers may be assigned in rotation to this duty.

The financial question gives no trouble if the business is well managed. It will be seen, by consulting the percentage of expenditures as stated for the Horace Mann lunch-room, that 13 per cent. covers rent and profit. The percentage for service includes the salary of a capable woman, who is the actual manager. If no rent is paid and no profit required, this 13 per cent. could well be added to the manager's salary, thus making it sufficient to secure a scientifically trained supervisor.

Expert supervision is a prime necessity. In a city system, where luncheon is served in a large number of schools, the best plan is to place at the head a supervisor who directs the whole, and trains the women who work under her in the separate schools. A fixed salary for such a director is, in the end, the most economical plan; but if a school board does not wish to assume a seeming risk, the supervisor may be allowed to make what profit she can until the scheme is proved a financial success. Of course, it is not easy to obtain a trained worker under these conditions; and the school board should at least furnish equipment, leaving the responsibility for food and service only to the supervisor. If it is not possible to secure this amount of expert supervision, some member of a school committee or some one of the teaching staff should study the whole matter and act as adviser of the unskilled women who do the practical work. It is doubtful if any such arrangement can be completely successful, and the school luncheon should not be condemned as impracticable until it has been conducted by workers especially trained, and thus given fair trial. When the management is placed in the hands of an ignorant janitor, who is to make what he can for himself and his friends, it is no wonder that the luncheon is a failure.

The foregoing remarks cover the ground of the general suggestions to be made to school boards. Each system or school has its own special problem. Given space, an adequate equipment, and a supervisor with scientific and business training, the

school luncheon will not fail to meet the requirements of the situation. The following instances will serve to illustrate what has already been done under different conditions.

No. I. is an example of a very simple luncheon served to a small number of children during the winter of 1903–4 at Tome Institute, Port Deposit, Md., under the supervision of Miss Lillie M. Wilson. This experiment has proved so successful that a woman is to be engaged to take entire charge of the luncheon, and a larger number will be served.

I. Tome Institute Luncheons

The purpose is to furnish hot, nourishing, and attractive luncheons, at the least possible cost, to those children coming on trains, who were buying sweets and other articles not suitable for a noon meal. For want of a more suitable place, luncheon is served in the cooking laboratory.

Method of Serving.—Children pass around room, stopping at stove for soup; pass to sandwich table, where checks are also given out; pass on to seats. Cocoa is served them while sitting; also checks and money collected. Each one washes his or her own dishes, puts them back where found, brushes crumbs from table and floor, then passes from room. Two people are required to serve the lunch smoothly.

About thirty grammar school children take luncheon, beginning at 11.45. At 12.30 the high school children arrive, usually not numbering more than eight, but this number varies.

The favorite luncheon consists of soup and one or two sandwiches, at six or eight cents. Another favorite combination is soup, cocoa, and sandwich, at ten cents. The cost of labor is very little, hence the extremely low prices.

Below is a list of foods served:

	Cents
Soup	5
Soup, plain sandwich, cocoa	10
Soup, plain sandwich	6
Plain sandwich, cocoa	6
Peanut sandwich, cocoa	8
Baked beans	5
Fish-balls	5
Oyster stew	8
Custards	5
Plain bread puddings	5

II. Boston Public Schools

This plan has been carried out for nine years in the public schools of Boston and will serve as an illustration of what may be done in a school system at moderate cost. The matter was taken up by the school committee at the instigation of Dr. Caroline Hastings of the sub-committee on hygiene. The plan was made possible by the existence of the New England Kitchen, which already furnished cooked food in large quantities. The method of introduction and maintenance in each school building is as follows:

1. *Room.*—The best available, assigned by the master, who is the responsible housekeeper of the school building. In one or two buildings a wide hallway is used with long boards on "horses." Any makeshift which seemed feasible to the master must be put up with. In newer schools there is a place provided.

2. *Equipment.* (*a*) *Permanent.*—Sink, plain board counter, locked closets, and gas stove (put in free by the gas company in many cases). This permanent fitting is the property of the city. (*b*) *Portable.* Large bain-marie, two to four gallons; cans with indurated fiber cases for transporting soup and cocoa; box cases and baskets for other foods; heavy but decent cups, plates, spoons, tumblers; towels. Cost, about $300 for a large school.

3. *General Scheme of Management.*—This is the result of careful study of the daily working of the first plan, and of many variations on it, by a superintendent who is a college woman and a chemist. This superintendent went from school to school, watching the serving and eating, suggesting here and there, trying new ways and new foods, consulting with the lunch manager and with the kitchen people, until the various schools settled into shape, when they ran on in a fairly smooth way. The struggle for satisfaction and variety is constant, and calls for the highest degree of ingenuity, good judgment, and patience, as well as knowledge of food materials and digestive qualities.

4. *Service.*—First, a manager at $1 a day. This may be the sister or wife of the engineer or janitor living at or near the school, or some other responsible person who can watch the tastes of the pupils and learn to order the suitable quantities

and keep up the variety by judicious encouragement to try new dishes. This person takes the money and reports to headquarters once a week. Second, others as needed to work from about 11 to 1 o'clock. This help is not always easy to secure, since the hours break into a whole day.

5. *Routine.*—At the central kitchen the order for the day is put up over a shelf or table on which are placed the boxes and baskets for the bakery products. As these are ready the requisite number is counted out—sandwiches, tarts, etc.; at the last moment the cans of ice-cream and of hot soup are added. The various express men then take their own packages without confusion.

Suppose lunch is to be served at 11.30. Food arrives at from 10.30 to 11, according to the distance from the central kitchen (one half to four miles). The manager has the bain-marie full of hot water, pitchers, etc., and receives and checks the food. Workers arrive and proceed to set out the dishes in long rows, and to put out the portions of cold food, fruit, sandwiches, buns, cookies, etc.; then the milk is poured into the glasses and covered with crackers or bread. At the last moment hot soup and cocoa are poured from hot pitchers. With three persons to pour into the cups, hot liquid is insured, as the minute of the children's coming is known beforehand.

Three to four hundred may be served in ten minutes. Since no provision for luncheon time was originally made in the school scheme and no change in time has been made since, the recess is usually only twenty minutes. This makes it imperative to have the serving instantaneous all along the line. As the children file past they take the combination which pleases them and pay at once. In some places there are settees; in others the children stand, the old buildings having no provision for tables. In the manual training school, with longer school hours, a longer time, heartier food, and more eating space are furnished.

6. *Clearing Away.*—The corps collects, washes, and puts away the dishes. The manager collects and packs the unused food to send back to the kitchen, notes the evidences of favor or disfavor of the day's dishes, locks up the silver and the few boxes of crackers kept on hand, makes out the order for the next

day and sends it with the cans and the remainder of food to the central kitchen.

III. Horace Mann School, Teachers College

This serves to show what may be done in a mixed school of boys and girls, including all grades of the elementary and the high school, where the instructors and a large number of college students, both men and women, are also served. This luncheon is a gradual development from a simple luncheon of milk, cocoa, and sandwiches, which was served first about eight years ago. The business side is managed by a caterer of experience, who places in charge a woman who is capable on the practical side. The latter orders supplies and makes the menus. A committee from the School and College staff acts as the advisory board.

1. *Rooms.*—Two rooms in the basement are used: a large one for the dining-room, and a smaller one adjoining for the kitchen. The latter is inadequate.

2. *Equipment. Kitchen Fixtures.*—Gas range with four double burners, oven, broiler, fume pipe. Sink with three stationary tubs, drain board. Supply closet for storing provisions. Cupboard for storing dishes.

Kitchen Furniture.—Refrigerator with compartment having ice chamber above, zinc lined; butter chamber; milk chamber below; miscellaneous below.

Serving tables, cast iron. Working tables (four): one for hot utensils, half wood, half zinc; one for bread and sandwiches, oilcloth covered; small size for miscellaneous work; medium size for washing glassware.

Chairs, six for kitchen.

Utensils: large size, granite ware—two soup kettles, two double boilers, three dish pans; for baking, spoons, six small pans. Steel utensils: two skillets and teakettle.

Miscellaneous: scales, coffee-mill, small bread box, bread slicer, knives, forks, and spoons.

Lunch Room Fixtures.—Lunch counter with mahogany top, 2 feet 4 inches wide, $1\frac{1}{2}$ inches thick; pine front, 3 feet 6 inches, with movable shelves; and cashier's desk. Brass rail in front of counter to allow space for customers. (See plate.)

Steam table, 6 feet 6 inches by 2 feet, with eight planished iron platters and three planished iron gravy dishes, and covers; two large porcelain jars and two medium porcelain jars.

Four-gallon, copper, nickel-plated tea urn.

Two-gallon, copper, nickel-plated water urn.

Two-gallon, copper, nickel-plated coffee urn.

Fourteen-gallon, copper, nickel-plated, porcelain lined, cork-packed water cooler, having two self-closing faucets.

Copper, nickel-plated drainer, 2 feet by 6 inches.

Lunch Room Furniture.—Forty-two quartered-oak tables, 2 by 8 feet; pine table for water cooler, 5 by 5 feet; 314 bent-wood chairs, with close cane seats and open backs; high bent-wood chair for cashier.

Ice chest; ice-cream freezers holding two to three gallons.

Silver: 12 dozen forks, 12 dozen knives, and 36 dozen tea and 12 dozen table spoons.

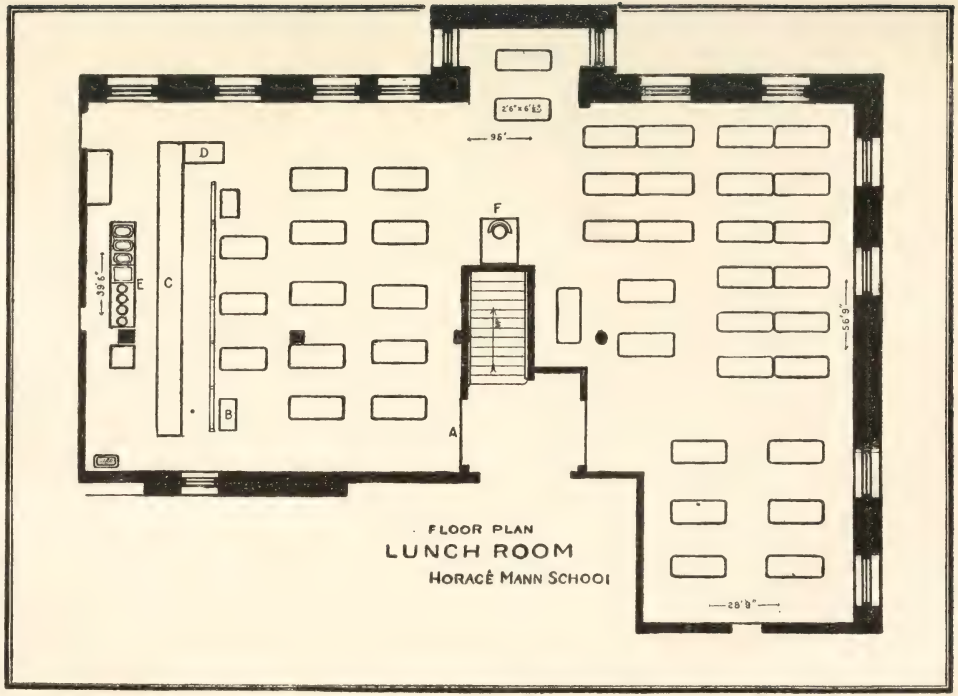
Dishes: 30 dozen breakfast plates, 12 dozen sauce plates, 12 dozen cups and saucers, 4 dozen soup mugs, 3 dozen milk bowls, 4 dozen individual vegetable dishes, 6 large pitchers, 4 dozen individual pitchers, 4 sugar bowls, and 42 mustard jars.

Glassware: 30 dozen tumblers, 6 dozen sherbet cups, 1 dozen vinegar cruets, 42 sets salts and peppers.

Miscellaneous:—24 dozen Japanned tin trays, 6 wire racks, 2 dozen straw baskets, paper napkins 40,000 (annually).

3. *Service.*—Seven maids do the serving. Duties of maids in lunch-room: four dust, one prepares urn and counter, one polishes brass, one fills salt, pepper, and mustard. Duties in kitchen: one cuts bread, one prepares seasoning and condiments, five make sandwiches; all act as waitresses from 11 A.M. to 2 P.M. Duties of cook and helper: cook prepares hot dishes; helper does dish-washing, waits on the cook, prepares vegetables, mops floors.

4. *Routine* (see plate).—The pupil enters the door A, helps himself at B to a tray and Japanese napkin; then passes in front of the counter C, where are placed such articles as sandwiches, cold puddings, fruit stewed and fresh, and so on. On the wall behind the counter is posted the special menu for the day. The pupil helps himself from the regular menu on the counter or asks the women behind the counter for what he wants



FLOOR PLAN

LUNCH ROOM

HORACE MANN SCHOOL

from the special menu. At the farther end of the counter is a box containing knives, forks, and spoons, to which he helps himself. He then pays at the cashier's desk and passes on to any one of the tables. The trays and dishes are removed by the maids. Beside the doors are placed large receptacles in which pupils are requested to leave papers and luncheon boxes as they pass out. The steam tables are at E; the water-tank, where glasses are placed, at F. The cashier is also the supervisor of the whole lunch-room. This seems to be the best method yet devised for rapid serving; it works well even at the hour when there is the greatest pressure.

5. *Menu and Prices.*

I. Regular menu

A. Plan

Sandwiches, cakes, fruit, and beverages—such things as will go well with luncheons brought from home. These are placed in order on the counter, with the exception of the hot beverages. The sandwiches are kept moist by dampened cloths.

B. Articles and prices

1. Sandwiches—5 cents each

a. Regularly

Ham
Tongue
Roast beef
Cheese
Jam

b. Occasionally

Sardine
Chicken
Egg
Lettuce
Nut

2. Fruit—3 cents each, or 5 cents a plate

a. Regularly

Bananas
Oranges
Apples

b. In season
Peaches
Pears
Plums
Figs
Dates
Strawberries
Tangerines

3. Beverages—5 cents a cup
Cocoa
Tea
Coffee
Milk—small glass, 3 cents
large " 5 "
bowl, 5 cents

NOTE.—Tea and coffee are sold to teachers and college students only.

4. Crackers, etc.
Shredded wheat biscuit—2 for 5 cents
Soda crackers—2 for 1 cent
Graham crackers—2 for 1 cent

5. Cakes
Mixed cakes—2 for 5 cents
Cream puffs—2 for 5 cents
Charlotte Russe—5 cents each
Ginger snaps—1 cent each
Fig bars—2 for 5 cents
Macaroons—2 for 5 cents

6. Miscellaneous
Ice-cream—10 cents
Hard-boiled eggs—3–5 cents
Chocolate pudding—5 cents
Preserves and apple-sauce—5 cents
Sweet chocolate—varying prices

II. Variable menu
A. Plan
1. Every day
a. Soup
b. Two hot dishes—meat, eggs, or fish
c. One hot vegetable
d. Salad
e. Dessert

2. The menu is changed
   a. From day to day
   b. From week to week
3. Special orders—chops, eggs, etc.
   a. Ordered the day before
   b. Filled at once, if the materials are at hand

B. Menus for two consecutive weeks, with cost

NOTE.—Each meat order includes mashed potato and two slices of bread and butter. With roast pork, apple-sauce is also served.

Monday

First Week	Cents	*Second Week*	Cents
Vegetable soup	5	Vegetable soup	5
Irish stew	15	Beef stew	15
Roast beef	20	Roast lamb	20
Spaghetti	5	Boiled rice	5
Cabbage salad	5	Cabbage salad	5
Lemon jelly	5	Lemon jelly	5

Tuesday

	Cents		Cents
Macaroni soup	5	*Purée* of green peas	5
Pork and beans, Boston brown bread	15	Pork chops	15
Lamb chops, tomato sauce.	20	Roast sirloin of beef	20
Boiled rice	5	Spaghetti	5
Cheese salad	5	Cheese salad	5
Rice pudding	5	Chocolate pudding	5

Wednesday

	Cents		Cents
Chicken soup	5	Mutton broth	5
Liver and bacon	15	Cream of lettuce soup	5
Chicken *pâté*	20	Minced lamb on toast	15
Boiled rice	5	Scrambled eggs	15
Lettuce salad	5	Beef *à la mode*	20
Rice pudding	5	Spaghetti	5
		Cabbage salad	5
		Chocolate pudding	5

Thursday

	Cents		Cents
Mutton broth	5	Chicken soup	5
Chicken soup	5	Pork and beans, Boston brown bread	15
Lamb croquettes, green peas	15	Lamb chops, tomato sauce	20
Braised beef	20	Boiled rice	5
Spaghetti	5	Cheese salad	5
Cheese salad	5	Chocolate pudding	5
Chocolate pudding	5		

Friday

	Cents		Cents
Clam chowder	5	Clam chowder	5
Baked fish	15	Fish cakes, tomato sauce	15
Hamburg steak	20	Chicken *pâté*	20
Boiled rice	5	Boiled rice	5
Cabbage salad	5	Lettuce salad	5
Chocolate pudding	5	Rice pudding	5

6. *Provisions, Method of Buying and Storing.*
   - A. Staples
     1. Sugar
        - *a.* powdered—½ bbl.
        - *b.* granulated—½ bbl.
     2. Flour—25 lb. bag
     3. Salt—large bag
     4. Pepper—large can
     5. Mustard—large can
     6. Rice—one bag
     7. Macaroni—one bag
     8. Crackers—by the box
        - *a.* Sweet
        - *b.* Soda and Uneeda
        - *c.* Fruit
     9. Beverages
        - *a.* Coffee—5 lb. can
        - *b.* Tea—10 lb. can
        - *c.* Cocoa—large can
     10. Olive oil—5 gal. can
     11. Vinegar—large jug

B. Perishable
  1. Kinds
    a. Dairy
      (a) Milk—36 qts. daily
      (b) Butter—1 tub
      (c) Eggs—½ case
      (d) Cheese
        American—whole cheese
        Neufchâtel—small packages
      (e) Ice-cream—6 gal. daily
    b. Meats
      (a) Salt
        Whole ham
        " tongue
      (b) Fresh
        Lamb—quantity variable
        Beef— " "
        Chicken— " "
    c. Bakery products
      (a) Bread—36 loaves daily
      (b) Rolls—4 dozen
      (c) Doughnuts—4 dozen
      (d) Cakes—small
        Spice—4 dozen
        Chocolate—4 dozen
        Vanilla—4 dozen
      (e) Pastry
        Cream puffs—3 dozen
        Chocolate éclairs—4 dozen
      (f) Charlotte Russe—4 dozen
    d. Fruit and vegetables
      (a) Fruit
        Apples
        Oranges
        Bananas
      (b) Vegetables
        (See menu)
  2. Method of buying
    a. Staples, large quantities—wholesale
    b. Perishable—retail as needed

7. *Customers.*—It will be noticed that the ages of the customers vary greatly. As a rule the younger children buy very simple articles. While the children are, in most cases, free to take what they like, the coffee and tea which are served for college students and instructors are forbidden to the children unless they bring a letter from the principal to the supervisor of the lunch-room; since this permission is never given, the rule is prohibitive. The supervisor is much interested in the children and helps them to make wise selections whenever this is possible.

A. Elementary school
   1. Time of serving, 10.45–11.45 A.M.
   2. Luncheons: sandwiches brought from home, supplemented by milk, chocolate, sweets, and fruit.

B. Secondary school
   1. Time, 11.50 A.M. to 12.30 P.M.
   2. Luncheons, as selected by the customers
      a. Home lunches supplemented by
         Cakes
         Chocolate
         Fruit
         Ice-cream
         Beverages
      b. School lunches
         (a) Substantial food
            Sandwiches
            Hot dishes
         (b) Sweets
            Charlotte Russe
            Chocolate
            Cakes
            Ice-cream
         (c) Fruits

C. Teachers and college students
   1. Time, 12.30–2 P.M.
   2. Luncheons, similar to those of the secondary pupils

D. Total number served, average 600 daily

8. *Cost*

A. Equipment

1. Lunch-room

Lunch counter and cashier's desk	$ 292.00
Brass rail in front of counter	79.00
42 tables at $11.75	493.50
26 dozen chairs at $17.50 per dozen	455.00
Steam table (in exchange for old)	97.00
Tea urn	45.50
Copper urn (for water), nickel plated	7.15
Nickel-plated drainer (under cock of urn)	3.75
Nickel-plated drainer with drain connections	8.00
Water cooler	54.00

2. Kitchen

Refrigerator	125.00
Gas range	130.00
Partition, tables, kitchen closets, and dressers	705.00
	$2,494.90

B. Current expenses

Food supplies	53 %
Service	28 %
Wear and tear	6 %
Rent and profit	13 %
	100 %

Acknowledgment for the details of the systems described is due to Mrs. Ellen H. Richards of the Massachusetts Institute of Technology, Boston, and to Miss Sarah E. Wentworth, manager of the Boston system; to Miss Lillie M. Wilson, Tome Institute, Port Deposit, Md.; to Mr. Cowan, general manager of the Horace Mann lunch-room; and to Miss Bruckman, Miss Schauffler, and Miss Wells, senior students in domestic science of the class of 1904, Teachers College.

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May, 1905

CITY SCHOOL EXPENDITURES

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Teachers College Record

Edited by Dean James E. Russell

TEACHERS COLLEGE RECORD is a serial publication issued by Teachers College, Columbia University, for the purpose of presenting to students of Education, and to the public generally, a comprehensive view of the history and principles of education, of educational administration, and of the theory and practice of teaching as advocated and followed by Teachers College and its schools of observation and practice.

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ANNOUNCEMENT OF VOLUMES VI AND VII
1905 and 1906

The special feature of the year 1905–06 will be a series of monographs on the elementary school curriculum, by teachers of the Horace Mann Elementary School, with the co-operation of Professor Frank M. McMurry and Principal Henry C. Pearson. The four numbers will present the practical work of the different grades as follows: first grade; second and third grades; fourth and fifth grades; sixth and seventh grades.

Advance orders for the set of four (price, $1.00) will be filed as received and filled according to date as numbers are issued.

Other issues now in preparation will deal with "Problems of Secondary Education," "Manual Training," and "Nature-Study."

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TEACHERS COLLEGE RECORD

VOL. VI MAY, 1905 No. 3

CITY SCHOOL EXPENDITURES

THE VARIABILITY AND INTERRELATION OF THE PRINCIPAL ITEMS

By GEORGE DRAYTON STRAYER, A.B., Johns Hopkins University; Fellow in Education, Teachers College, 1904–05

INTRODUCTION

The importance of the subject-matter of Mr. Strayer's investigation needs no comment. The methods, being in some respects new in the literature of education, deserve some comment.

It is impossible to gain adequate insight into facts as complex as those of school expenses and school achievements without some use of technical statistical methods. If Mr. Strayer's report puzzles some readers by its tables of frequency, its constant use of the median rather than the average as a measure of central tendency, its coefficients of correlation and their corrections, it is of necessity. The facts could not otherwise be handled properly—in some cases not at all.

The one matter of technique which needs explanation and perhaps apology is the use of the Pearson Coefficient of Correlation. This measure of the general relation of a deviation of the amount of one item in the budget from the typical amount of that item to the deviation in the same city of some other item from its typical amount, is indispensable but necessarily obscure. It is indispensable: (1) because it presents to the mind in a single figure a mass of individual relationships which

in their detailed form leave no definite impress on even the most skilled examiner of statistics (*e. g.*, let any one try to measure accurately the facts of the relation of teachers' salaries to janitors' salaries without its aid); (2) because it makes all relationships between any one and any other of the same order of facts comparable and commensurate (*e. g.*, let any one without its use say whether the total cost per pupil is more or less closely followed by the cost per pupil of text-books and supplies than by that for janitors' salaries). It is necessarily obscure: (1) because the general tendency for which it stands represents a result which an indefinite number of different arrangements of relationships could all equally give, and (2) because the variability of the individual relationships, from which it rescues us in part, still remains to prevent any prophecy of the coefficient's implication concerning any special case other than a most complicated statement of probabilities. Readers who are familiar with modern statistics will have gained a concrete acquaintance with coefficients which will make tables XXXVII, XXXIX, etc., clear and emphatic. To others they cannot be. On the whole, although the arithmetical labor of calculating these coefficients is enormous, they should be used in all studies of relationships of mental and social traits. Those calculated by Mr. Strayer will increase in importance as we obtain from the budgets of private schools, colleges, business corporations, and the like, similar coefficients to compare with them.

One other feature of Mr. Strayer's method of presentation needs comment—his careful arrangement of the individual measures from which all his later results are derived. The publication of these in full enables any critic to verify the conclusions, any investigator of the same problem to combine new data with them so as to get better advantages from both, and any investigator of other problems to use in his own way a body of facts which could be obtained now only at a cost of hundreds of hours, and in a few years could not be obtained at all. The reader who is irritated, as well as awed, by the pages of individual records must remember that in the social sciences lumping facts into averages and totals conceals far more truth than it reveals, and destroys half the value of the record to the expert.

EDWARD L. THORNDIKE

April, 1905

THE PROBLEM

The financial problem in connection with our public schools is fundamental. We may devise improved courses of study, we may provide for the proper training of teachers, our aim may be sound and our method well grounded, and still we must have the money to build and properly equip and maintain buildings, to provide the necessary books and supplies, to hire the competent supervisors and teachers, or all will count for naught. We believe that our schools have advanced in this country during the past fifty years, and we know that along with this advance the amount of money spent for public education has increased in a ratio altogether out of proportion to the number of people educated. Still further, we believe that those sections of our country which to-day spend the most money for public education are the sections which are doing the best work. Especially with the growth of cities and the great increase of urban population has the amount of money spent for public schools grown larger. But even the great increase in expenditure, amounting in some cases to ten- or even twenty-fold during the past fifty years, has not been sufficient to satisfy the demands of those who believe in the efficacy and necessity of public education in our modern democracy.

President Eliot, in his address before the Connecticut State Teachers' Association in 1902, argued for more liberal expenditures for public education, in order that we might accomplish by this means certain desirable ends which we have as yet failed to attain. He sums up his argument in one part of his address as follows: "My first argument in support of this proposition is that, as a nation and on the whole, in spite of many successes, we have met with many failures of various sorts in our efforts to educate the whole people, and still see before us many unsurmounted difficulties. It is indisputable that we have experienced a profound disappointment in the results thus far obtained from a widely diffused popular education. It was a stupendous undertaking at the start, and the difficulties have increased with every generation. Our forefathers expected miracles of prompt enlightenment; and we are seriously disappointed that popular education has not defended

us against barbarian vices like drunkenness and gambling, against increase of crime and insanity, and against innumerable delusions, impostures, and follies. We ought to spend more public money on schools, because the present expenditures do not produce all the good results which were expected and may reasonably be aimed at." [1]

In a second address to the New Hampshire State Teachers' Association in the same year, President Eliot maintained that more money should be given to the public schools, because of the great gains that have been made in public education. Some of the improvements to which he called attention were the establishment of kindergartens, improvement in the curricula of elementary schools, increase in the number of high schools, improvement in school buildings, new kinds of schools (manual training, the mechanic arts high school, the evening school, and the vacation school), improvement in normal schools, improved methods of selecting and appointing teachers, pensions for teachers, increased employment of educational experts in supervising and executive functions of urban school systems, the increased use of high schools, the introduction of the costly elective system, better university teachers, improved professional training, increased opportunity for the higher education of women, and increased attention given to the welfare of the body. Every one of these educational improvements, says President Eliot, "has been costly; but every one has justified itself in the eyes of the tax-payers, or of those who voluntarily pay for it; not one would now be recalled, and the total result encourages the expectation that large new expenditures would commend themselves to the people at the start, and in the end would prove to be both profitable in the material sense and civilizing in the humane sense.

"You have doubtless noticed that the gains I have reported are chiefly in education above fourteen years of age. There has been improvement in the first eight grades since 1870, but it is relatively small. Yet the great majority of American children do not get beyond the eighth grade. Philanthropists, social philosophers, and friends of free institutions, is that the fit educational outcome of a century of democracy in an unde-

[1] Eliot, *More Money for the Public Schools*, p. 23.

veloped country of immense natural resources? Leaders and guides of the people, is that what you think just and safe? People of the United States, is that what you desire and intend?" [1]

There is nothing unusual nor radical in this appeal of President Eliot. In almost every educational journal one can find arguments for increased expenditures for teachers' salaries. In many states laws have been passed or proposed which declare that all text-books shall be furnished free to children. In every community new school buildings are built better than the old. More attention is given to proper heating, lighting, and ventilating. All this means an increase in school expenditures. Along with this great increase in expenditure and with the demand for still greater sums of money for public education, there has arisen the necessity for greater ability in the handling of school moneys, and, on the part of the tax-payers who furnish the money, a desire to know how the money is spent and what results are obtained.

Those who have controlled our free public schools have always had the double function of attending to the business affairs of the school system, as well as looking after the matter of instruction. In the early days, when the chief expenditure was for the teacher's salary and there were very few other items of expense, it was a comparatively simple matter to administer the finances of the then small school systems. With the great growth of cities and school systems, together with the enormous increase in amount and variety of expenditures, the problem of business administration has become very complex. This demand for expert ability in dealing with the business affairs of the schools has been met in different ways. In some instances a special committee of the school board or committee has been given charge of the financial affairs of the schools. In many cases the superintendent has not only supervised instruction, but has also been the business manager for the school system. In other cases, notably in Cleveland and Indianapolis, a special executive officer has been provided to look after the business affairs. There is a growing feeling that the business affairs of the large school systems demand expert ability, and that it is financially profitable for a large city to employ a business

[1] Eliot, *More Money for the Public Schools*, pp. 125–127.

director to look after the financial interests of the school system. The Chicago Commission, appointed in 1898, recommended that the function of the school board "be chiefly legislative, the executive work being delegated to the superintendent and business manager."[1] However desirable it may be to have a special executive officer whose duty it shall be to look after the business affairs of the schools, the fact remains that in vastly the greater majority of cities of over ten thousand inhabitants this work is now done by the school board, by the superintendent of schools, or by the board and the superintendent in co-operation with each other.

In the year 1899 there reported to the Department of Superintendence of the National Educational Association the Committee on Uniform Financial Reports, which had been appointed at the previous meeting. Something of the purpose for which this Committee was appointed, as well as their recommendations, may be found in the following quotation:

"While local conditions enter into the necessities for expense in any public school system, yet one of the most useful means of estimating proper expenditures should be afforded by a study of the financial school reports of other similar cities or districts. As these reports are at present made, they are of little use in this respect. Items given in one report are omitted from another. Items of income and outgo are differently grouped in different reports, and the statement is made in such a way that it is impossible to separate the items for the purpose of re-classification. In getting the cost of education per child, different items are put into the total cost of education, which forms the dividend, while the divisor is sometimes the number enrolled, sometimes the average number in daily membership, sometimes the average number in daily attendance.

"One of the chief studies of a wise administrator of schools is to make the cost of education per child as low as is consistent with the best service. Attention to this and to the comparative study of the reports for a period of years, now that most of our school systems are established on a somewhat similar plan, should give an idea of the average or normal cost of education per child. Having this, the manager of schools may know how expense in his system differs from this normal stan-

[1] *Report of the Chicago Educational Commission.*

dard, and, if not normal, why it is above or below. This knowledge cannot be arrived at, however, until the same items are included when comparing cost of education, and the same divisor is used when obtaining the average. By careful comparative study, railroad men know the average cost of hauling freight per ton per mile, and the cost per mile of transporting a passenger. Those administering schools should be as well informed upon the cost of education." [1] Concerning the form of report recommended by this Committee, we shall have something to say later.

Just at this point it is interesting to verify their statement with regard to the non-uniformity of reports. Unfortunately, the work of this Committee seems to have had little effect upon the reports which have been issued since 1899. The sources of information concerning school expenditures are: the Report of the Commissioner of Education for the United States, the several State Reports, and the City Reports. In the Report of the Commissioner of Education, school expenditures for cities of over 8000 inhabitants are classified under four heads, namely: (1) permanent investment and lasting improvements, (2) teaching and supervision, (3) current and incidental expenses, and (4) evening schools. It is hardly necessary to state that if any comparison among different cities is to be made, a further distribution of these items is necessary.

The item "teaching and supervision" contains several items of expenditure which should be compared with each other; while the item "current and incidental expenses" is so general that we are unable to tell anything about the use which is made of the money.

If we turn to State Reports we are again disappointed. The Massachusetts State Report classifies city school expenditures under the following heads: teachers' salaries; conveyance of pupils; fuel and care of premises; school committee, including clerical aid and truant service; superintendent of schools; textbooks and school supplies; school sundries; alterations and permanent repairs; new schoolhouses; and ordinary repairs. This classification is superior to that found in the Report of the Commissioner of Education, because of the more detailed information which it gives. One might wish, however, that fuel and

[1] *Proceedings of the National Educational Association, 1899*, p. 345.

the care of school premises could be given as separate items; and when we remember the difference in the salaries paid to high school teachers and to elementary school teachers, it would seem that these items should be further subdivided.

In the Pennsylvania State Report expenditures are classified as follows: schoolhouses, purchasing, building, renting, etc.; teachers' wages; cost of school text-books; cost of school supplies other than text-books including maps, globes, etc.; fuel, contingencies, fees of collectors, and all other expenses. It is easily seen that the Pennsylvania Report gives less definite information than the Massachusetts Report, and that a comparison of the expenditures for cities of the two States could not be made from the material available.

The New Jersey State Report classifies expenditures as follows: teachers' salaries; fuel and janitors' salaries; building and repairing; debt and interest; manual training; text-books, apparatus, and supplies; transportation of pupils; other school purposes. Again it is hardly necessary to suggest that the item "teachers' salaries" is not sufficiently specific for the purpose of comparison. It may be well enough for the information of patrons to account for fuel and janitors' salaries under one head, but if one were interested in the relation between janitors' salaries and the amount of fuel consumed, this classification would scarcely answer the purpose.

In the New York State Reports there is still less information given concerning the money expended by cities for school purposes.

The City Reports, so far as I have been able to examine them, are little more satisfactory than the State and National Reports. Items which are given in one report, are omitted or combined with other items in another report in such manner as to make comparisons impossible. Frequently there is included under a single head an item of expenditure which properly belongs to current expense for maintenance and operation, and another which might better be classified as falling under the head of permanent equipment.

In about half of the reports which I have examined, teachers' salaries are given as a single item. Miscellaneous expenses, that is, the money which is spent but not definitely accounted for, amounts to from one to twenty-five per cent. of the entire

expenditure. In one report, school furniture and rent are given as one item. In another, janitors' and truant officers' salaries are given as a single item, without any explanation as to whether the janitor acts as truant officer or not. Text-books, supplies, permanent equipment or apparatus make one item of another report. Fuel and repairs are grouped together in another, and so on through the entire list. Mr. Jesse D. Burks, in an unpublished study, found three thousand different heads under which information concerning city school systems was given in the annual reports.

It was because of this state of affairs that the Committee of the National Educational Association on Uniform Financial Reports was appointed; and it was with the same problem in view that President Butler, in a discussion of a paper on "Taxation and Teachers' Salaries" before the National Educational Association in 1902, said: "What we need and need very badly in this country, is not only a more scientific system of taxation, but more adequate and exact information as to what should be the relative cost of various elements in the disbursements of our cities, towns, and villages. For example, no one knows just what ought to be the normal cost of the public school system of a city of 250,000 people. We know how rapidly such population increases, and how many children of school age come under the care of the community each year, but we do not know what the school system should normally cost, or what should be the proportion of its cost to the total cost of maintaining the local government. Nor do we know what proportion of a city school system should be charged to teachers' salaries, what to supplies, what to supervision, and what to the other items which make up the total bill of expense. Here is a field of investigation which is of surpassing interest, not only to school officer and superintendent, but to every intelligent citizen. It cannot be entered upon too soon, for the subject is one that goes to the very bottom of our public life." [1]

The problem which we have undertaken in this investigation is a part of that which President Butler so clearly outlined. This study will deal with the distribution of the money spent for schools among the various items of the budget. Whether or not we may hope to determine the norm which

[1] *Proceedings of the National Educational Association, 1902*, p. 329.

should be followed, of this we are certain, that some information concerning current practice can be secured, and that a solution to some of the problems which arise may be suggested because of this more adequate knowledge of present conditions.

DATA

The data which furnish the basis of this study were secured from fifty-eight cities of between ten and fifty thousand inhabitants, located in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. To the Superintendent of Schools in each city the following blank form was sent:

Teachers College
Columbia University
New York

Data for research in Educational Administration. School Expenditures for the year 190 and 190 , in the city of..... state of.....

I. Current Expenses:		$	
1. Salaries for supervision (Superintendent, Assistant, Deputy, or Associate Superintendents, and Principals).....		.....	....
2. Salaries for business administration (salaries of members of the Board of Education, Business Manager, Superintendent of Buildings and Grounds, Clerks to Board of Education, etc., etc.).....	No.	.....	....
3. Salaries of Janitors (number and aggregate of their salaries).....		.....	....
4. Salaries of Matrons or Maids in connection with Kindergartens and Baths (number and aggregate of their salaries).....		.....	....
5. Salaries of Truant Officers (number and aggregate of their salaries).....		.....	....
6. *Salaries for Teaching:*			
Number of Elementary School (Primary and Grammar) Teachers and aggregate of their salaries...		.....	....
Number of High School Teachers and aggregate of their salaries.....		.....	....
Number of Kindergarten Teachers and aggregate of their salaries.....		.....	....
Number of Evening School Teachers and aggregate of their salaries.....		.....	....

	No.	$	
6. *Salaries for Teaching: (Continued.)*			
Number of Truant School Teachers and aggregate of their salaries			
Number of Teachers' Training School Teachers and aggregate of their salaries			
Number of Special Teachers or supervisors of special subjects (Manual Training, Cooking, Sewing, Drawing, Music, Nature Study, Penmanship, Physical Education, etc.) and aggregate of their salaries			
Number of Vacation School and Play Ground Teachers and aggregate of their salaries			
What are the daily wages of (1) Carpenters, $.....(2) Bricklayers, $.....(3) Day Laborers, $..... in your city?			
7. Text-books, including copy- and drawing-books and repairs to books			
8. Supplies consumed by pupils (paper, pencils, ink, chalk, pens and pen-holders, erasers, laboratory, manual training, cooking, and kindergarten *supplies*, etc., etc.)			
9. Janitors' Supplies (brooms, brushes, towels and washing of towels, toilet paper, soap, etc., etc.)			
10. Supplies for Board of Education, Superintendents', and Principals' offices			
11. Fuel			
12. Light and Power			
13. Water			
14. Ordinary repairs to Buildings and Grounds			
15. Rent			
16. School Census			
17. Transportation of Pupils			
18. Insurance			
19. Freight and Expressage			
20. Printing and Advertising			
21. Telegraph, Postage, etc			
22. Telephone			
23. *Other Current Expenses:*			
.....			
.....			
.....			
Are books furnished free to indigents?.....to all students?.....What supplies are furnished free to indigents?			
.....			
.....			
.....to all students?			
.....			
.....			

II. Plant and Permanent Equipment:		
1. New buildings and sites, furniture and furnishings *for new buildings*, and permanent improvements to buildings and grounds	.....	....
2. Furniture (exclusive of that put in new buildings)	.....	....
3. Permanent equipment or apparatus (scientific apparatus, tools or apparatus for manual training and cooking, typewriters for commercial departments, maps, charts, globes, etc., etc.)	.....	....
4. Reference and Library Books	.....	....
III. Paid on Principal of Bonded Debt	.....	....
IV. Paid on Principal of Loans	.....	....
V. Paid for Interest	.....	....
VI. All other Expenditures: (If important expenditures have been omitted in the above classification, will you kindly itemize such expenditures below.)		
.....	.....	....
.....	.....	....
.....	.....	....
Total Expenditures for the year:		
VII. Bonded School Debt at end of the year	.....	....
VIII. Paid for Evening Schools [total current expenses, included in (I) above]	.....	....
IX. Paid for Teachers Training Schools [total current expenses, included in (I) above]	.....	....

Cities of between ten and fifty thousand inhabitants were chosen because this is the type city in the United States. Of 562 cities of over eight thousand inhabitants, according to the census of 1900, 481 cities are between eight and fifty thousand. Not only is the city above fifty thousand much less common than the city of fewer inhabitants, but it is more apt to present problems peculiar to itself, and hence does not admit so well of comparison. Even if it had been possible to secure information from as many of the larger cities, they would necessarily have been so scattered, and conditions of climate, rate of growth in population, general economic welfare, tradition with regard to public education, etc., would have been so different that a comparison could not so well have been made.

After having chosen the size of city to be studied, the terri-

tory was limited to the states named above because it was felt that in this region conditions were very similar.

In the territory covered there are 117 cities of between ten and fifty thousand. For the school year 1902–1903 the blank form given above was filled out by fifty-eight cities. For the school year 1903–1904 similar data were secured from thirty of these cities before this investigation was completed.

The form of report used was drawn up with two purposes kept constantly in mind, namely: first, that the several items of expenditure should be so reported that they would admit of comparison; second, that as far as possible the whole expenditure should be reported under proper heads—that the item generally termed "miscellaneous expenses" should, so far as possible, be eliminated. It will be noticed, however, that a place for reporting such expenditures was allowed to remain on the blank. In preparing this form, we considered carefully the form of report recommended by the Committee of the National Educational Association, and have in some parts followed their classification. On the other hand, it seemed to us that in more than one instance their classification was not the best, because it did not provide for sufficient detail. The first item under expenditures in that report is salaries of teachers and supervisors. Now, if a comparison is to be made, it seems to us that this item needs to be further subdivided. It may be that one city is paying entirely too much for supervision. We may want to discover if there is any relation between a large amount of money spent for supervision and the amount spent for school supplies. In order to discover these things, it will be necessary for us to subdivide the item of "salaries."

Again, in order that we may be able to make a valid comparison, it has seemed wise to divide the salaries for teaching into several items, namely: the amount paid elementary school teachers; high school teachers; kindergarten, evening school, truant school, and teachers' training school teachers; special teachers, or supervisors of special subjects; and teachers in vacation schools and play grounds. As stated above, we can only compare the item of salaries when we know in what way that money was spent.

In the report of the National Educational Association Committee, supplies are classified under two heads—stationery and

other supplies for schools. We have thought it best to classify all supplies consumed by pupils under a single head, including in this item paper, pencils, ink, chalk, pens, pen-holders, blackboard erasers, laboratory, manual training, cooking, and kindergarten supplies, etc. In order that we may be able to use this item and that of text-books intelligently, our form contains the following questions: Are text-books furnished free to indigents? Are they furnished free to all pupils? What supplies are furnished free to indigents? to all students?

Other supplies are classified under two heads: janitors' supplies and supplies for the board of education, superintendents', and principals' offices. Besides the item of janitors' salaries, we include, as a separate item, salaries of matrons or maids in connection with the kindergartens or baths.

In addition to the item of fuel and light (which we classify under two heads, namely, fuel, and light and power) and ordinary repairs to buildings given in the National Educational Association Report, we have seen fit to classify current expenses under the following additional heads: water; rent; school census; transportation of pupils; insurance; freight and expressage; printing and advertising; telephone, telegraph, postage, etc.; and other current expenses. We did not expect that all would report expenditures under each of the above heads, but we do think that if there are such expenses it is best that they be reported separately.

Our second large heading we have designated as "plant and permanent equipment." Under this head we make four subdivisions, namely: (1) new buildings and sites, furniture and furnishings for new buildings, and permanent improvements to buildings and grounds; (2) furniture exclusive of that put in new buildings; (3) permanent equipment or apparatus, including scientific apparatus, tools and apparatus for manual training and cooking, typewriters for commercial departments, maps, charts, globes, etc.; (4) reference and library books.

In asking for the amount paid on principal of bonded debt, on principal of loans, for interest, the total current expenses for evening schools, and for teachers' training schools, we have followed the recommendation of the National Educational Association Committee.

In another part of the report, we ask for the wages of car-

penters, bricklayers, and day laborers in the city from which information is received, hoping in this case to be able to infer something concerning the cost of living in that city, which will in turn enable us to form a correct idea concerning the salaries paid to teachers.

Of the fifty-eight cities reporting the first year, thirty were able to report their total expenditure under the classification given, without resorting to the use of the ambiguous heading "miscellaneous." Of the remaining twenty-eight cities, sixteen reported less than 2 % under the head "miscellaneous"; ten others reported less than 5 %; and the remaining cities reported 5.14 % and 6.75 % for unclassified expenditures. For the second year, of the thirty cities reporting, eighteen report nothing under "miscellaneous"; and of the remaining twelve, eight report 1 % or less, three 2 %, and one 3.76 % under this head.

In order to compare the expenditures in the different cities with but two years' data, it seemed best to base all comparisons upon the cost of maintenance and operation, that is, the expenditures which are absolutely necessary in order to keep the schools going, together with the amount spent for keeping the plant in proper repair. Under this head we included furniture put into old buildings, that is, new furniture put in to replace old; and also money spent for apparatus and for reference and library books. These expenditures, we believe, are properly classified as expenditures for maintenance and operation, since they seldom represent any very large increase in permanent equipment. In the printed form given above, they were placed under "plant and permanent equipment," because the writer believed that it was customary to place them there and that proper returns could be most easily secured by classifying them in this way. To have taken into consideration the amount spent for new buildings or grounds, or for permanent improvements, would have been unfair to some cities, because in some cases a much larger proportion of such expenditures is met by an issue of bonds than in others. The item of interest is not included in the cost of maintenance and operation for a similar reason. This item is sometimes included in the public school budget, while in other cases it is paid by the city. On this point the National Educational Association Committee on Uniform Financial Reports says:

"Expenditures seem to fall into three classes: the usual

current expenditures necessary for the maintenance of schools; expenditures for sites, buildings, permanent improvements and equipment; other expenditures which, for various reasons, are not put in either of the two preceding classes.

"For the purpose of this report the first of these classes is by far the most important, for it would probably be conceded that from this item of current expense should be determined the cost of education per child, the most important item to be shown." [1]

After having determined the classification to be used, and that the total expenditures for maintenance and operation should serve as the basis for comparison, the question which next arises is, "How shall the separate items be compared as among the different cities?" It has been common to compare the expenditures for different cities on the basis of the cost per pupil in daily attendance. We shall use this method, and, in addition, it seems well to compare the different items on a slightly different basis, namely, the cost per pupil based upon a figure half-way between the average daily attendance and the average daily enrolment. In discussing this point, the National Educational Association Committee on Uniform Financial Reports says:

"For many reasons No. 39" (average number in daily membership, all schools) "seems the most suitable divisor. If computed in a uniform manner, the figures showing number in average daily membership would most nearly show the requirements for school rooms, furniture, supplies, and teachers. But it is not true that these figures are obtained by the same process, or based upon the same facts, in the different school systems. Usage varies so in computing membership in different schools—pupils in some cases being counted as members of the schools, when in other cities the same state of facts would cause the child to be considered as no longer a member of the school—that fair comparison is apparently not practicable by the use of this divisor.

"Your committee is of the opinion that a divisor as little subject to misunderstanding as possible, and one based upon facts which are obtained in the same way everywhere, is of the first importance. The members believe that this is provided by item 40, average number in daily attendance, all schools,

[1] *Report of the National Educational Association, 1899*, p. 347.

and we have, therefore, made that item the divisor to be used, in connection with items 12 and 13, to obtain what shall be known as the 'cost of education.'" [1]

The school must provide teachers, buildings, and equipment for more than the average daily attendance, and yet it is seldom that provision is made for a number equal to the average daily enrolment. It seems, therefore, that the figure half-way between the two is a better figure than either of the others. It was impossible to secure the figures for the average daily enrolment in some cases, and for this reason the average cost per pupil for the first and second year will be based upon the average daily attendance, even though we do not believe it is so good a figure as the other.

Still another basis for comparison recommends itself—the apportionment of money spent for specific purposes expressed in per cents of the total expenditures for maintenance and operation. This last classification offers a particularly interesting basis for comparison and is entirely free from obscurity. The question is simply one of distribution of the money that is spent among the several items of the budget. Just as an individual may spend too much for clothes, for food, for books, or for amusement, in the same manner it is possible for a city to spend too great a proportion of its money for janitors, for fuel, for school supplies, or even for supervision.

The information which has been collected is given in the tables which follow. Throughout the study each city is known by the number which is given it in the first table.

These tables (Tables I to IX) contain every fact with which we work. Any one can, from the data here given, repeat all our calculations. Moreover, it may happen that some one else may wish to use the information which furnishes the basis of this study for a different purpose. It is unfortunate that many studies, involving the use of data which were secured with considerable difficulty, have been published without giving the data upon which the conclusions were based. Such an omission makes it impossible for any one else to verify the conclusions which the author has reached, and denies to others the use of valuable data which they might use for purposes quite as important as those for which the information was first collected.

[1] *Report of the National Educational Association, 1899*, pp. 349–352.

TABLE I

Gross expenditures for maintenance and operation for the school year 1902–03. Fifty-eight cities of from 10,000 to 50,000 inhabitants in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. The amounts are scored in dollars.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.
1.	76,252	47,712	2,200	392	5,033	300	3,919	2,531	664	83	3,473	359
2.	60,492	38,015	2,000	150		350	2,690	662	300		10,163	286
3.	52,708	35,918	2,100		3,725			3,235	530		2,481	2,399
4.	153,729	98,028	16,570	550	10,950	400	5,194	4,449	1,078		7,357	353
5.	121,400	89,100	2,700	650	8,000	950		7,300	200	300	7,400	600
6.	50,613	36,860	2,100		2,660			3,315	100	50	2,079	130
7.	85,975	57,320	7,600	500	9,113	810	2,401	3,596	816		3,560	
8.	60,473	35,150	8,200		8,675	750	3,000	900	100	200	3,528	100
9.	100,484	66,883	2,800	1,080	7,520	500		6,749			9,414	
10	217,991	160,832	3,683	1,482	12,886	1,000	5,011	7,052	583	913	9,285	572
11.	82,100	40,800	9,490	900	7,500	900		5,500			5,000	500
12.	71,281	45,775	6,500		5,402	168	2,075	2,660			5,000	
13.	95,802	51,578	16,660	614	6,587	900	2,493	2,706	234		6,309	179
14.	39,960	24,828	2,000		2,717	100	1,243	993	109		3,271	200
15.	116,039	82,062	2,500	550	7,019	200	4,607	4,607	310		7,801	314
16.	25,639	17,290	2,000		1,641	350	742	849			1,297	
17.	99,717	62,645	7,800	600	7,000	400	2,901	3,061		30	7,320	815
18.	43,570	30,700	1,950		2,960	100		3,300			2,800	
19.	52,870	33,250	1,800	350	3,600	70	2,500	1,500			3,800	
20.	59,772	42,730	1,275		3,080	400	1,422	929	95		5,896	78
21.	52,178	36,080	6,575	100	3,070	100		800	200	100	2,000	100
22.	17,368	12,856		205	727			1,018	259	37	714	60
23.	45,745	13,150	13,450	300	6,839	300					4,531	
24.	29,787	19,296	2,750	450	1,861		200	422	30	30	2,000	136
25.	30,398	21,250	2,400		1,500		100	100	30	50	2,000	35
26.	95,064	53,487	15,920	550	5,580	100	1,922	2,899	123	91	4,220	143
27.	40,622	22,812	4,250		2,951		2,473	725			1,899	
28.	46,041	30,001	1,800	590	3,328	300		1,732			3,474	
29.	56,374	34,745	1,640		3,944	175		3,847	640		2,870	20

TABLE I (*Continued*)

Gross expenditures for maintenance and operation for the school year 1902–03 Fifty-eight cities of from 10,000 to 50,000 inhabitants in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. The amounts are scored in dollars.

Number of City.	Water.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Express.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.	Evening Schools (included in items already given).
1.		4,018	15	528	1,570		337	245	53	220	1,248	308	1,008	35	1,503
2.	141	3,249	100	100	1,800					35		300	150		1,821
3.		2,044										275			839
4.	581	5,087	264	100			237	180	50	449		546	1,306		1,556
5.		1,200		400	1,260					40		400	600	300	3,200
6.		2,000			750		94	79	25	20			350		762
7.		6,356		100	2,000	833	140	492	43	12		283			
8.	200	2,278		100	1,088	369	75	150	50	60		250	150	100	760
9.	550	150		150						86	4,602				794
10.	1,144	11,542		250	974			528		44					
11.	3,500	400		750	750	100	110	10	150		5,540	200			1,800
12.		2,500	163	98	690		100			150					1,153
13.	520	2,496	140	100	455	1,560	158	156	35	5	1,211	451	204	48	874
14.		2,811	48	36	646		134	76			239	298	140	70	
15.		3,173	800	125	997		159	260	33	37		100	325		
16.	300	1,030		50	89										635
17.		3,974		85	1,000		190	333	40	75	225	332	690	200	1,924
18.		1,200		60	300		50	100	25	25					
19.	200	3,000		125	1,500		90	100	15	20		300	650		
20.	531	2,192	225		190			138		32	557				522
21.	80	2,000				305	50	30	20	18		400		150	250
22.		1,148	22	33			25	108	5				150		1,698
23.	280	3,216	213	120	1,440				15		675	276	940		
24.	277	873		54		618		91	15	49	377		250		
25.	250	1,800		75		250	10	250	10	138			50	100	
26.	523	3,254	556	281	100	1,280	76	300	50	43			500	3,065	808
27.	181	957	818	155		50		116				369	669	412	
28.	2,092		216	194						76	1,350	355	532		1,690
29.	158		6,008	126	696		266	220					669	350	

TABLE I (*Continued*)

Gross expenditures for maintenance and operation for the school year 1902–03. Fifty-eight cities of from 10,000 to 50,000 inhabitants in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. The amounts are scored in dollars.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.
30.	110,846	74,946	3,000	800	7,013	1,000	1,892	3,087	765		5,481	206
31.	70,593	39,850	2,000	700	4,650	800	3,957				8,826	225
32.	80,361	44,437	3,000	700	4,500	400	852	1,500	301	1,500	5,249	592
33.	21,515	14,525	2,750	300	1,320	78		149	38	25	1,072	35
34.	49,993	32,176	2,160	600	4,060	780	25	458	300	200	5,025	108
35.	104,414	76,142	2,100	717	6,811	750	90		411	260	5,916	282
36.	38,677	22 809	6,700	300	1,340	120		250	80	20	2,000	271
37.	50,462	29,874	8,502	1,017	2,656	250			1,043		3,024	
38.	24,278	15,686	1,800		934	400	50	100	155	50	1,336	
39.	51,887	32,305	5,750	500	2,700	400		909	400		3,416	
40.	54,614	34,362	2,225	694	2,172	450	945	2,282	177		4,804	
41.	87,209	56,574	3,662	1,626	4,004	84	4,952		126	20	5,294	418
42.	89,467	48,525	13,900	1,000	4,684	1,000	4,500	3,500	500		5,000	
43.	62,348	40,642	2,200	397	4,143	500	1,166	1,053	431	67	5,520	236
44.	48,410	30,852	2,200	300	2,930	420	569		61	750	4,844	234
45.	88,459	59,334	2,000	150	4,730	600	4,815	1,071	250	150	3,343	806
46.	107,537	66,153	12,200	800	4,930	540	3,076	1,854	1,008	500	4,229	128
47.	58,427	16,294	9,500	2,108	4,931	500	1,950		1,620		9,411	347
48.	18,402	10,745	1,800	200	1,100	244	787	250	40	30	1,131	41
49.	14,877	9,512	1,800	100	600	200	771	150	100	52	814	
50.	81,954	51,099	5,700	1,400	2,775	500	3,685	1,303	150		5,128	214
51.	64,465	42,350	8,950	650	3,525	425	1,200	300	150	50	3,600	70
52.	100,305	52,500	6,625	725	7,000	600	3,000	3,500	625	450		4,500
53.	144,783	96,925	17,700	1,000	9,990			7,057		1,397		4,034
54.	75,700	42,225	8,100	950	4,200		2,900	3,450	600	250	3,750	800
55.	35,800	22,000	1,200	200	1,900	400	2,000				2,000	200
56.	50,192	27,415	8,175	400	4,200	150	800	929	600	844	2,195	203
57.	114,800	74,375	11,400	2,150	5,425		3,000	5,000	250	250	4,500	500
58.	77,200	48,650	7,455	500	4,180			5,000	1,000	500	2,500	200

TABLE I (*Continued*)

Gross expenditures for maintenance and operation for the school year 1902–03. Fifty-eight cities of from 10,000 to 50,000 inhabitants in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey. The amounts are scored in dollars.

Number of City.	Water.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Express.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.	Evening Schools (included in items already given).
30.		8,157		75			931	660		351		1,021	201	1,261	675
31.		4,522	250	270		194		370		96	2,551	886	446		2,047
32.		8,541		300		424	151	644		240	3,014	2,000	500	1,516	
33.		1,011		62		50	9	55	21		15				
34.		730		266	250	730		615		96	239	850	325		
35.		2,915		185		370	75	678	80	249	4,202	590	696	903	
36.	218	877		125		400	75	25	25	100		494	230	326	
37.		1,179				100		291			1,646			878	
38.		2,386		50		279	25	148	21		319	50	189	300	
39.		2,200				98		949		60				2,200	
40.	396	1,909		72		799	47	1,102			703	283	1,190		
41.	763	156	1,585	201	91	616	193	229	138	194	100	523	1,277		
42.	1,000	2,500				1,006	75	260	50	150		1,000	500	317	
43.	369	1,546	100	259	171	31	25	310	52	39	1,734	417	528	407	
44.	393	2,079	1,116			595	94	130	30			284	335	194	
45.		6,139				982	108	780		100	1,452	395	150	443	
46.	360	2,787	3,870		277		197	571	108	485	108	1,500	600	656	619
47.	120	7,706	382			1,048		662	188		1,196	100	364	844	
48.	96	275	450	50		84	30	291	10		591	68	41	50	
49.	27	198		35		87	26	17	6		41	135	133	73	
50.		5,642	1,000	318		193	50	508	150	10		1,729		369	
51.		1,200		50		595	35	125	25	90		75	500	500	
52.		15,000				1,200	700	800	100		1,800		1,000	180	
53.		4,681										1,999			2,495
54.		3,175			350	600	275	350	50	275	915	350	1,675	280	1,950
55.		1,000									3,500	500	500	400	
56.		2,683				284		152		119	443	300	100	200	
57.		5,000				250	250	300	150			1,000	500	500	650
58.	350	4,000	850			100	5	100	10	200			100	1,500	

TABLE II

Gross expenditures for maintenance and operation for the school year 1903–04, thirty of the cities which reported for 1902–03 reporting. The amounts are scored in dollars.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.
5.	124,160	90,100	2,700	640	8,400	920	3,500	1,200	200	200	10,000	800
6.	44,648	26,957	2,100		2,970	50	1,000	2,000	150		3,500	175
8.	63,749	44,554	2,100		3,675	750	3,000	600	100	100	3,500	
13.	114,634	70,099	15,455	500	6,518	1,000	2,663	3,434			7,548	
14.	41,793	26,935	2,000		3,306	101	1,043	1,319	47		3,565	
15.	116,108	70,129	18,020	675	7,390	200	2,490	3,928	168	98	6,783	229
16.	26,918	18,381	2,000		1,819	200	442	897			1,899	
20.	59,423	43,106	1,800		3,256	400	2,000	1,181	123		5,011	61
27.	40,637	22,598	5,686		3,217		2518				902	74
28.	47,036	31,195	1,800	570	3,328	300	1395				6,303*	
29.	50,616	32,349	1,547	250	4,263	146	4,037				3,067	45
30.	117,263	78,771	3,000	850	7,342	1,100	1,978	3,263			5,055	188
31.	77,025	50,751	2,000	700	5,075	800	536				7,766	113
32.	68,924	38,100	11,300	750	5,000	400	1,100	800	500	348	4,150	541
34.	45,412	29,105	2,000	600	4,857	780	52		663	1,070	1,639	
35.	123,116	89,360	6,775		5,870	810	100	500	407	300	7,808	149
36.	38,904	26,070	6,500	300	1,424	200		250	75	20	2,500	192
37.	53,161	31,107	9,283	1,121	2,790	250		664	100		4,198	24
39.	46,859	29,000	5,950	480	2,580	400		1,454	626	1,113	3065	
40.	54,556	27,563	9,850	1,200	1,980	450	1,475	2,080	274		3248	
41.	90,956	51,597	12,830	1,637	4,123	68	5,035		280	191	6,684	282
42.	92,550	50,050	14,600		4,784	1,000	4,690	3,803	606	1,051	4,400	221
43.	71,995	51,961	2,200	491	4,527	500	1,500	653	585	100	2,210	239
45.	91,573	61,140	5,800	1,200	5,255	600	3,573	1,500	500	400	3,709	900
48.	23,806	13,454	3,425	250	1,290	300	854	830	30	200	1,215	25
52.	106,235	63,885	5,950	2,300	8,400	1,000	4,200	3,500	500	350	4,000	1,000
54.	70,496	36,716	8,450	600	3,736		5,450	7,275	150		4,086	
55.	32,000	21,525	2,000	200	1,900		1,800	150	50		1,500	400
56.	49,888	33,525	2,200	400	4,150	100	900	1,200	500	100	2,195	203
57.	120,163	77,915	11,500	2,150	6,725		3,000		4,375		4,750	800

* Including repairs.

TABLE II (*Continued*)

Gross expenditures for maintenance and operation for the school year 1903–04, thirty of the cities which reported for 1902–03 reporting. The amounts are scored in dollars.

Number of City.	Water.	Repairs.	Rent.	School Censtis.	Transportation of Pupils.	Insurance.	Freight and Express.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.	Evening Schools (included in items already given).
5.		1,200		400	1,400		125	150	75	50	1,300	200	500	100	2,300
6.		4,000		75	750	450	116	75	50	30			200		852
8.	180	2,200		100	1,211	500	50	200	75			205	50	600	400
13.	600	2,733	117		360	939						168	2,500		756
14.		1,972	130	39	675	193	173	111	24	18	110	30			
15.		3,287	800	125	893		100	354	36	35			267	100	
16.	300	786		50	144										612
20.		1,415			158			185		345	692				628
27.	182	1,500	500			526				17		1,494	645	330	131
28.		6,303		198							1,228		718		2,733
29.	176	2,592		125	788		184	211		434			400		
30.		10,822		75				985		355		427	1,995	1,057	
31.		7,025		290		543		214		99		447		667	1,277
32.		2,500		240		850	201	251		240		600	800	250	
34.		2,326			250	1,500	25			96		50	200	200	
35.		6,069				795	50	300	100	240		1,273	1,566	744	800
36.	210	50	60			168	60	75	15	100		410	75	150	
37.		2,415				504		379				100		225	
39.		1,871				209				60					
40.	403	2,051				50		1,318		60	2,036	518			
41.	568	3,252	200			182	139	367	59	26		2,280	572	585	
42.	604	3,120				751	99	213	110			1,068	750	630	
43.	559	2,095	100			730	50	437	100	141	1,705	552	277	384	
45.		4,634				350	200	762		100	438	388	175	350	
48.	40	920		30		100		540	40	60			100	103	
52.		5,000				2,500	650	700	100			1,000	1,000	200	
54.		2,000			350	443	50	100	25	200			614	256	
55.		400						100	10	75	790	600		500	
56.		1,800				283	200	152	50	119	310	1,000	200	300	1,000
57.		5,000	900			250	500	200	100		500	900	400	200	750

TABLE III

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Fifty-eight cities, for the school year 1902–03.

Number of City.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.	Repairs.
1.	62.6	2.9	.5	6.6	.4	5.1	3.3	.9	.1	4.6	.5		5.3
2.	63.1	3.3	.3		.6	4.5	1.1	.5		16.8	.5	.2	5.4
3.	68.2	4.0		7.1			6.1	1.0		4.7	4.6		3.9
4.	63.7	10.7	.4	7.1	.3	3.4	2.9	.7		4.8	.2	.4	3.3
5.	73.7	2.2	.5	6.6	.8		6.0	.2	.3	6.1	.5		1.0
6.	72.9	4.2		5.3			6.6	.2	.1	4.1	.3		4.0
7.	59.8	7.9	.5	9.5	.8	2.5	3.7	.8		3.7			6.6
8.	58.1	13.6		6.1	1.2	5.0	1.5	.2	.3	5.8	.2	.3	3.8
9.	66.9	2.8	1.1	7.5	.5		6.7			9.4		.5	.1
10.	73.8	1.7	.7	5.9	.5	2.3	3.2	.2	.4	4.3	.3	.5	5.3
11.	49.7	11.6	1.0	9.1	1.0			6.7		6.1	.6		4.3
12.	64.2	9.1		7.6	.2	3.5		3.7		7.0			3.5
13.	53.9	17.4	.6	6.9	.9	2.6	2.8	.2		6.6	.2	.5	2.6
14.	62.5	5.0		6.8	.3	3.1	2.5	.3		8.2	.5		7.1
15.	71.2	2.2	.5	6.2	.2	4.0	4.0	.3		6.7	.2		2.7
16.	67.5	7.8		6.4	1.4	2.9	3.3			5.1		1.2	4.0
17.	62.8	7.8	.6	7.0	.4	2.9	3.1			7.3	.8		4.0
18.	70.4	4.5		6.8	.2			7.6		6.4			2.7
19.	62.9	3.4	.7	6.8	.1	4.7	2.8			7.2		.4	5.7
20.	71.5	2.1		5.2	.7	2.4	1.2	.2		9.9	.1	.9	3.7
21.	69.1	12.6	.2	5.9	.2		1.5	.4	.2	3.8	.2	.2	3.8
22.	73.9	1.2		4.2			5.9	1.5	.2	4.1	.4		6.6
23.	28.8	29.4	.7	14.9	.7					9.9		.6	7.0
24.	64.7	9.2	1.5	6.3		.7	1.4	.1	.1	6.7	.5	.9	2.9
25.	69.9	7.9		4.9		.3	.3	.1	.2	6.6	.1	.8	5.9
26.	56.2	16.7	.6	5.9	.1	2.0	3.1	.1	.1	4.4	.2	.5	3.4
27.	56.2	10.4	1.1	7.9		6.1	1.8			4.7		.4	2.3
28.	65.2	3.9	1.3	7.2	.7		3.8			7.5		4.6	
29.	61.6	2.9		7.0	.3		6.8	1.1		5.1	.1	.3	

TABLE III (*Continued*)

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Fifty-eight cities, for the school year 1902–03.

Number of City.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Express.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
1.		.1	2.1		.4	.3	.1	.3	1.6	.4	1.5	.1
2.	.2	.2	3.0					.1		.5	.3	
3.										.5		
4.	.2	.1			.2	.1		.3		.3	.8	
5.		.3	1.1							.3	.5	.3
6.		.2	1.5		.2	.2	.1				.7	
7.		.1	2.1	.9	.1	.5	.1			.3		
8.		.2	1.8	.6	.1	.3	.1	.1		.4	.3	.2
9.		.1						.1	4.6			
10.		.1	.5			.2						
11.	.5		.9	.9	.1	.1		.2	6.8	.2		
12.	.2	.1	1.0		.1			.2				
13.	.2	.1	.5	1.6	.2	.2	.1		.8	.5		.1
14.	.1	.1	1.7		.3	.2			.6	.7	.4	.2
15.	.7	.1	.9		.1	.2				.1	.3	.1
16.		.2	.4									
17.		.1	1.0		.2	.3		.1	.2	.3	.7	.2
18.		.1	.7		.1	.2	.1	.1				
19.		.2	2.8		.2	.2				.6	1.2	
20.	.4		.3			.2		.1	.9			
21.				.6	.1	.1				.7		.3
22.	.1	.2			.1	.6					.9	
23.		.5	.3	3.2						1.5	.6	2.1
24.		.2		2.1		.3	.1	.2	1.3		.8	
25.		.3		.8		.8		.5			.2	.3
26.	.6	.3	.1	1.4	1	.3	.1				.5	3.2
27.	2.0	.4		.1		.3			4.4	.9	1.7	1.0
28.	.5	.4						.2	2.9	.8		1.2
29.	10.8	.2	1.2		.5	4					1.2	.6

TABLE III (*Continued*)

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Fifty-eight cities, for the school year 1902–03.

Number of City.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.	Repairs.
30.	68.4	2.7	.7	6.3	.9	1.7	2.8	.7		4.9	.1		7.4
31.	56.5	2.8	1.0	6.6	1.1		5.6			12.5	.3		6.4
32.	55.3	3.7	.9	5.6	.5	1.1	1.9	.4	1.9	6.5	.7		10.6
33.	67.5	12.8	1.4	6.1	.3		.7	.2	.1	4.9	.1		4.7
34.	64.5	4.3	1.2	8.1	1.6	.1	.9	.6	.4	10.0	.2		1.5
35.	73.2	2.0	.7	6.6	.7	.1		.4	.3	5.7	.2		2.8
36.	59.0	17.4	.8	3.5	.3		.6	.2	.1	5.2	.7	.6	2.3
37.	59.2	16.9	2.0	5.3	.5		2.1			6.0			2.3
38.	64.5	7.4		3.8	1.7	.2	.4	.6	.2	5.5			9.8
39.	62.3	11.1	1.0	5.2	.8		1.8	.8		6.6			4.2
40.	63.2	4.0	1.3	3.9	.8	1.7	4.1	.3		8.7		.7	3.5
41.	64.9	4.2	1.9	4.6	.1		5.7	.1		6.1	.5	.9	.2
42.	54.2	15.5	1.1	5.2	1.1	5.0	3.9	.6		5.6		1.1	2.8
43.	65.3	3.5	.6	6.7	.8	1.9	1.7	.7	.1	8.9	.4	.6	2.5
44.	63.8	4.6	.6	6.1	.9	1.2		.1	1.5	10.0	.5	.8	4.3
45.	67.1	2.3	.2	5.3	.7	5.4	1.2	.3	.2	3.8	.9		6.9
46.	61.3	11.3	.7	4.6	.5	2.9	1.7	.9	.5	3.9	.2	.3	2.6
47.	27.9	16.3	3.6	8.4	.9	3.3		2.8		16.1	.6	.2	13.2
48.	58.4	9.8	1.1	6.0	1.3	4.3	1.4	.2	.2	6.2	.2	.5	1.5
49.	63.9	12.1	.7	4.0	1.3	5.2	1.0	.7	.4	5.5		.2	1.3
50.	62.9	7.0	1.7	3.4	.6	4.5	1.6	.2		6.3	.3		6.9
51.	65.7	13.9	1.0	5.5	.7	1.9	.5	.2	.1	5.6	.1		1.9
52.	52.3	6.6	.7	7.0	.6	3.0	3.5	.6	.4		4.4		15.0
53.	66.9	11.8	.7	6.9			4.9		1.0		2.8		3.2
54.	56.0	10.7	1.3	5.6		3.8	4.6	.8	.3	5.0	1.1		4.2
55.	61.5	3.4	.6	5.3	1.1	5.6				5.6	.6		2.8
56.	54.6	16.3	.8	8.4	.3	1.6	1.8	1.2	1.7	4.4	.4		5.3
57.	64.7	9.9	1.9	4.7		2.6	4.4	.2	2.0	3.9	.4		4.4
58.	63.1	9.7	.7	5.4	1.0		6.5	1.3	.7	3.2	.3	.5	5.2

TABLE III (*Continued*)

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Fifty-eight cities, for the school year 1902–03.

Number of City.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Expressage.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
30.					.8	.6		.3		.9	.2	1.1
31.	.4	.4		.3		.5		.1	3.6	1.3	.6	
32.		.4		.5	.2	.8		.3	3.7	2.5	.6	1.9
33.		.3		.2	.1	.3	.1		.1			
34.		.5	.5	1.5		1.2		.2	.5	1.7	.7	
35.		.2		.4	.1	.7	.1	.2	4.0	.6	.7	.9
36.		.3		1.0	.2	.1	.1	.3	4.9	1.3	.6	.8
37.				.2		.6			3.3		1.7	
38.		.2		1.2	.1	.6	.1		1.3	.2	.8	1.2
39.				.2		1.8		.1				4.2
40.		.1		1.5	.1	2.0			1.3	.5	2.2	
41.	1.8	.2	.1	.7	.2	.3	.2	.2	5.1	.6	1.5	
42.				1.1	.1	.3	.1	.2		1.1	.6	.4
43.	.2	.4	.3	.1	.1	.5	.1	.1	2.8	.7	.9	.7
44.	2.3			1.2	.2	.3	.1			.6	.7	.4
45.				1.1	.1	.9		.1	1.6	.4	.2	.5
46.	3.6		.3		.2	.5	.1	.5	.1	1.4	.2	.6
47.	.7			1.8		1.1		.3		2.0	.2	.6
48.	2.5	.3		.5	.2	1.6	.1		3.2	.4	.2	.3
49.		.2		.6	.2	.1	.1		.3	.9	.9	.5
50.	1.2	.4	.2	.1	.6	.2				2.1		
51.		.1		.9	.1	.2	.1	.1		.1	.8	.8
52.				1.2	.7	.8			1.8		1.0	.2
53.										1.4		
54.			.5	.8	.4	.5	.1	.4	1.2	.5	2.2	.4
55.									9.8	1.4	1.4	1.1
56.						.3		.2	.9	.6	.2	.4
57.				.2	.2	.3	.1			.8	.3	.4
58.						.1		.3			.1	1.9

TABLE IV

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Thirty cities, for the school year 1903–04.

Number of City.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text-Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.
5.	72.7	2.2	.5	6.8	.7	2.8	1.0	.2	.2	8.1	.6	
6.	60.5	4.7		6.7		2.2	4.5	.3		7.8	.4	
8.	70.0	3.3		5.8	1.2	4.7	.9	.1	.2	5.5		.3
13.	60.9	13.4	.4	5.7	.9	2.3	3.0			6.6		.5
14.	64.4	4.8		7.9	.2	2.5	3.2	.1			8.5	
15.	60.5	15.6	.6	6.4	.2	2.1	3.4	.1	.1	5.8	.2	
16.	68.3	7.4		6.8	.7	1.6	3.3			7.1		1.1
20.	73.0	3.0		5.5	.7	3.4	2.0	.2		7.4	.1	
27.	55.6	14.0	1.1	7.9		6.2				2.2	.2	.4
28.	66.4	3.8	1.2	7.1	.6	3.0					13.4	
29.	63.9	3.1	.5	8.4	.3		8.0			6.1	.1	.3
30.	67.3	2.6	.7	6.3	.9	1.7		2.8		4.3	.2	
31.	65.9	2.6	.9	6.6	1.0	.7				10.1	.1	
32.	55.3	6.4	1.1	7.3	.6	1.6	1.2	.7	.5	6.0	.8	
34.	64.0	4.4	1.3	10.7	1.7	.1		1.5	2.4	3.6		
35.	72.6	5.5		4.8	.6	.1	.4	.3	.2	6.3	.1	
36.	68.2	17.1	.8	3.7	.5		.6	.2	.1	6.5	.5	.5
37.	58.8	17.6	2.1	5.3	.5		1.3	.2		7.9	.1	
39.	62.0	12.7	1.0	5.5	.8		3.1	1.3	2.4	6.5		
40.	50.9	18.2	2.2	3.7	.8	2.7		.5	3.8	6.0		.7
41.	56.8	14.1	1.8	4.5	.1	5.5		.3	.2	7.3	.3	.6
42.	54.1	16.0		5.2	1.1	5.1	4.1	.6	1.1	4.8	.2	.6
43.	72.2	3.1	.7	6.3	.7	2.1	.9	.8	.1	3.1	.3	.8
45.	66.8	6.3	1.3	5.7	.7	3.9	1.6	.5	.4	4.0	1.0	
48.	56.5	14.4	1.0	5.4	1.3	3.6	3.5	.1	.8	5.1	.1	.2
52.	60.2	5.6	2.2	7.9	.9	4.9	3.3	.5	.3	3.8	.9	
54.	52.1	12.0	.8	5.3		7.7	10.3	.2		5.8		
55.	67.3	6.2	.6	5.9		5.6	.5	.2		4.7	1.2	
56.	67.2	4.4	.8	8.3	.2	1.8	2.4	1.0	.2	4.4	.4	
57.	64.9	9.6	1.8	5.6		2.5		3.6		4.0	7	

TABLE IV (*Continued*)

The amounts spent for each item expressed as per cents of the total amount spent for maintenance and operation. Thirty cities, for the school year 1903–04.

Number of City.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Expressage.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
5.	1.0		.3	1.1		1.0	1.2	.1		1.0	.2	.4	.1
6.	9.0		.2	1.7	1.0	.3	.2	.1	.1			.4	
8.	3.4		.2	1.9	.8	.1	.3	.1			.3	.1	.9
13.	2.4	.1		.3	.8						.1	2.2	
14.	4.7	.3	.1	1.6	.5	.4	.2	.1	.1	.3	.1		
15.	2.8	.7	.1	.8		.1	.3				.2	.1	
16.	2.9		.2	.5			.3						
20.	2.4			.3					.1	1.2			
27.	4.9				1.3						3.7	1.6	.8
28.			.4							2.6		1.5	
29.	5.1		.2	1.6		.4	.4			.9		.8	
30.	9.3		.1						.3	.8	.4	1.7	.9
31.	9.1		.4		.7		.3		.1		.6		.9
32.	3.6		.3		1.2	.3	.4		.3		.9	1.2	.4
34.	5.1			.5	3.3	.1			.2		.1	.4	.4
35.	4.9				.6		.2	.1	.2		1.0	1.3	.6
36.	.1	.2			.4	.2	.2		.3		1.1	.2	.4
37.	4.6				.9		.7				.2		.4
39.	4.0				.4				.1				
40.	3.8				.1		2.4		.1	3.8	1.0		
41.	3.6	.2			.2	.1	.4	.1			2.5	.6	.6
42.	3.4				.8	.1	.2	.1			1.1	.8	.7
43.	2.9	.1			1.0	.1	.6	.1	.2	2.4	.8	.4	.5
45.	5.1				.4	.2	.4		.1	.5	.4	.2	.4
48.	3.9		.1		.4		2.3	.2	.3			.4	.4
52.	4.7				2.4	.6	.7	.1	.1		.9	.9	.2
54.	2.8			.5	.6	.1	.1		.3			.9	.4
55.	1.3						.3		.2	2.5	1.9		1.6
56.	3.6				.6	.4	.3	.1	.2	.6	2.0	.4	.6
57.	4.2	.7			.2	.4	.2	.1		.4	.7	.3	.2

TABLE V

The average of the amounts spent for each item for two years expressed as per cents of the average total expenditure for two years. Thirty cities, for the school years 1902–03 and 1903–04.

Number of City.	Teaching and Supervision.	Supervision.	Janitors' Salaries.	Teaching.	Text-Books and Supplies.	Fuel.	Repairs.
5.	75.4	2.2	6.7	73.2	5.2	7.1	.9
6.	71.0	4.4	6.0	66.7	6.6	6.0	6.5
8.	72.5	8.4	6.0	64.0	6.0	5.7	3.6
13.	72.8	15.4	6.3	59.4	5.3	6.6	2.5
14.	68.4	4.9	7.4	63.4	5.6	8.1	5.9
15.	74.7	8.9	6.3	65.8	6.7	6.2	2.8
16.	75.5	7.6	6.6	67.9	5.6	6.1	3.5
20.	74.6	2.6	5.3	72.2	4.4	8.6	3.0
27.	68.1	12.6	7.6	55.9	7.0	3.5	3.6
28.	69.7	3.9	7.1	65.8	3.4		
29.	65.7	3.0	7.7	62.8	6.9	5.6	2.1
30.	70.5	2.6	6.3	67.8		4.6	8.3
31.	64.0	2.7	6.6	61.2		11.2	7.8
32.	65.4	10.1	6.4	55.3	2.8	6.3	7.1
34.	68.6	4.4	9.4	64.2		6.8	3.3
35.	76.7	3.8	5.7	72.9	.3	5.9	3.8
36.	80.8	17.2	3.6	62.6	.7	5.8	1.2
37.	76.2	17.2	5.2	59.2		6.9	3.4
39.	73.9	11.9	5.4	62.1		6.5	4.1
40.	68.1	11.1	3.8	57.0	6.1	7.3	3.6
41.	70.0	9.1	4.5	60.9	5.6	6.7	1.8
42.	69.8	15.7	5.2	54.1	9.1	5.1	3.1
43.	72.0	3.3	6.4	68.7	3.3	5.9	2.7
45.	71.2	4.3	5.5	66.9	6.1	3.9	5.9
48.	68.5	12.1	5.7	57.4	6.3	5.6	2.7
52.	62.4	6.1	6.4	56.2	7.3	3.6	9.8
54.	65.4	11.3	5.4	54.0	13.2	4.8	3.5
55.	69.2	4.8	5.6	64.4	5.8	5.1	2.0
56.	71.2	10.3	8.3	60.9	3.8	4.4	4.4
57.	74.5	9.7	5.1	64.8		3.9	4.2

TABLE VI

The cost per pupil expressed in dollars and cents. The number used as a divisor is the figure half-way between the average daily attendance and the average daily enrollment. Forty-eight cities, for the school year 1902–03.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text-Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.
1.	34.18	21.38	.99	.17	2.26	.14	1.75	1.13	.30	.03	1.56	.16	
2.	26.48	16.69	.88	.07		.15	1.17	.29	.13		4.39	.12	.06
3.	27.09	18.47	1.08		1.91			1.66	.27		1.27		
4.	30.91	19.73	3.33	.11	2.21	.08	1.05	.89	.22		1.48	.07	.12
5.	32.30	23.70	.72	.17	2.13	.25		1.94	.05	.08	1.97	.16	
6.	26.80	19.50	1.12		1.41			1.75	.05	.03	1.10	.07	
7.	21.19	12.65	1.68	.10	2.01	.18	.53	.79	.18		.78		
8.	29.80	17.29	4.04		1.81	.37	1.48	.44	.05	.10	1.74	.05	.10
9.	29.29	19.50	.82	.32	2.19	.15		1.96			2.75		.16
10.	41.21	30.40	.70	.28	2.44	.19	.95	1.34	.10	.17	1.75	.08	.22
11.	27.90	13.90	3.23	.31	2.56	.31		1.88			1.70	.17	
12.	28.28	18.12	2.58		2.14	.07	.82		1.06		1.99		
13.	28.53	15.33	4.96	.18	1.96	.27	.74	.81	.07		1.88	.05	1.6
14.	27.35	17.02	1.37		1.86	.07	.85	.68	.07		2.24	.14	
15.	24.33	17.20	.52	.12	1.47	.04	.97	.97	.06		1.64	.07	
16.	27.67	18.65	2.16		1.77	.38	.80	.92			1.40		
17.	34.88	21.90	2.73	.21	2.45	.14	1.02	1.07		.01	2.56	.28	
18.	34.59	24.39	1.55		2.35	.08		2.62			2.23		
19.	27.78	17.50	.95	.18	1.90	.04	1.32	.79			2.00		.11
20.	22.53	16.13	.48		1.16	.15	.54	.35	.04		2.23	.03	.20
28.	28.44	18.55	1.11	.36	2.05	.18		1.07			2.14		1.29
29.	27.91	17.20	.81		1.95	.09		1.91	.32		1.43	.01	.08

TABLE VI (*Continued*)

The cost per pupil expressed in dollars and cents. The number used as a divisor is the figure half-way between the average daily attendance and the average daily enrollment. Forty-eight cities, for the school year 1902–03.

Number of City.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Expressage.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
1.	1.80	.01	.24	.70		.15	.10	.02	.10	.56	.14	.45	.02
2.	1.42	.04	.04	.90					.01		.13	.07	
3.	1.05									1.23	.14		
4.	1.03	.05	.02			.05	.03	.01	.09		.10	.26	
5.	.32		.10	.34					.01		.10	.16	.08
6.	1.06			.40	.05	.04	.01	.01				.19	
7.	1.40		.02	.44	.18	.03	.09	.01			.06		
8.	1.12		.05	.54	.18	.04	.07	.02	.03		.12	.07	.05
9.	.04		.04						.02	1.34			
10.	2.18		.05	.18			.10		.01				
11.	1.19	.14		.26	.26	.03	.04		.05	1.89	.07		
12.	9.9	.06	.04	.27		.04			.06				
13.	.74	.04	.03	.14	.46	.05	.05	.01		.36	.13	.06	.01
14.	1.93	.03	.02	.44		.09	.05			.16	.20	.10	.05
15.	.67	.17	.03	.21		.03	.05	.01	.01		.02	.07	.01
16.	1.11		.05	.10									
17.	1.39		.03	.35		.07	.12	.01	.03	.08	.12	.24	.07
18.	.95	.05		.24		.04	.08	.02	.02				
19.	1.58		.06	.79		.05	.05	.01	.01		.16	.34	
20.	.83	.08		.07			.05		.01	.21			
28.	———	.13	.12						.05	.83	.22	.33	
29.		2.98	.06	.34	.13	.10						.33	.17

TABLE VI (*Continued*)

The cost per pupil expressed in dollars and cents. The number used as a divisor is the figure half-way between the average daily attendance and the average daily enrollment. Forty-eight cities, for the school year 1902–03.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text-Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.
30.	35.41	23.92	.96	.26	2.24	.32	.61	.98	.24		1.75	.07	
31.	26.82	15.20	.76	.27	1.77	.30	1.50				3.36	.09	
32.	33.50	18.52	1.25	.29	1.88	.17	.36	.63	.13	.63	2.19	.25	
33.	24.13	16.31	3.08	.34	1.48	.09		.17	.04	.03	1.20	.04	
34.	35.20	22.65	1.52	.42	2.82	.55	.02	.32	.21	.14	3.54	.08	
35.	24.08	17.55	.48	.17	1.57	.17	.02		.09	.06	1.36	.06	
37.	18.55	10.96	3.13	.37	.98	.09		.38			1.11		
38.	22.68	14.65	1.69		.87	.37	.05	.09	.15	.05	1.25		
39.	30.87	19.24	3.42	.30	1.61	.24		.54	.24		2.03		
40.	33.61	21.08	1.36	.43	1.33	.28	.58	1.40	.11		2.95		.24
41.	23.77	15.41	1.00	.44	1.09	.02	1.35		.03	.01	1.44	.11	.21
42.	28.23	15.31	4.39	.32	1.48	.32	1.42	1.11	.16		1.58		.32
43.	25.14	16.39	.89	.16	1.67	.20	.47	.43	.17	.03	2.23	.09	.15
44.	25.50	16.22	1.16	.16	1.54	.22	.30		.03	.39	2.55	.12	.21
45.	27.14	18.20	.61	.05	1.45	.18	1.48	.33	.08	.05	1.03	.25	
46.	39.40	24.23	4.47	.29	1.81	.20	1.13	.68	.37	.18	1.55	.05	.13
47.	18.33	5.11	2.98	.66	1.55	.16	.61		.51		2.95	.11	.04
48.	21.09	12.28	2.06	.23	1.26	.28	.90	.29	.05	.04	1.29	.05	.11
49.	20.93	13.40	2.54	.14	.85	.28	1.09	.21	.14	.07	1.15		.04
51.	29.83	19.60	4.14	.30	1.63	.20	.56	.14	.07	.02	1.67	.03	
53.	29.61	19.82	3.62	.21	2.04			1.44		.29		.83	
54.	52.75	35.07	5.64	.67	2.92		2.02	2.40	.42	.17	2.61	.56	
55.	19.61	12.08	.66	.11	1.04	.22		1.09			1.09	.11	
56.	27.12	14.82	4.42	.22	2.28	.08	.43	.50	.32	.46	1.18	.11	
57.	51.49	33.36	5.11	.96	2.43		1.35	2.24	.11	.11	2.02	.22	
58.	20.38	12.83	1.97	.13	1.11			1.32	.26	.13	.66	.05	.09

TABLE VI (*Continued*)

The cost per pupil expressed in dollars and cents. The number used as a divisor is the figure half-way between the average daily attendance and the average daily enrollment. Forty-eight cities, for the school year 1902–03.

Number of City.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Expressage.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
30.	2.61		.02				.21		.11	.30	.33	.06	.40
31.	1.72	.17	.10		.07	.14	.14		.04	.97	.34	1.7	
32.	3.56		.13		.18	.27	.27		.10	1.26	.83	.21	.63
33.	1.13		.07		.06	.06	.06	.02		.02			
34.	.51		.19	.18	.51	.43	.43		.07	.17	.60	.23	
35.	.67		.04		.09	.16	.16	.02	.06	.97	.14	.16	.21
37.	.43				.04	.11	.11			.61		.32	
38.	2.23		.05		.26	.02	.14	.02		.30	.05	.18	.28
39.	1.31				.06		.56		.04				1.31
40.	1.17		.04		.49	.03	.68			.43	.17	.73	
41.	.04	.43	.05	.02	.17	.05	.06	.04	.05	1.22	.14	.35	
42.	.79				.32	.02	.08	.02	.05		.32	.16	.10
43.	.62	.04	.10	.07	.01	.01	.12	.02	.01	.70	.17	.21	.16
44.	1.09	.59			.31	.05	.07	.01			.15	.18	.10
45.	1.88				.30	.03	.24		.03	.65	.12	.05	.13
46.	1.02	1.42		.10		.07	.21	.04	.18	.04	.55	.22	.24
47.	2.42	.12			.33		.21		.06		.37	.03	.11
48.	.31	.51	.06		.10	.03	.33	.01		.68	.08	.05	.06
49.	.28		.05		.12	.04	.02	.01		.06	.19	.19	.10
51.	.56		.02		.27	.02	.06	.01	.04		.03	.23	.23
53.	.96										.41		
54.	2.21			.24	.42	.19	.24	.03	.19	.64	.24	1.17	.19
55.	.55									1.92	.27	.27	.22
56.	1.45				.15		.08		.06	.24	.16	.05	.10
57.	2.24				.11	.11	.14	.07			.45	.22	.22
58.	1.06	.22			.03		.03		.05			.03	.40

TABLE VII

The cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor. Fifty-seven cities, for the school year 1902–03.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text-Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.
1.	35.64	22.30	1.03	.18	2.35	.14	1.83	1.18	.31	.04	1.63	.17	
2.	28.00	17.60	.93	.07		.16	1.24	.31	.14		4.70	.13	.07
3.	28.06	19.10	1.12		1.98		1.72		.28		1.32		
4.	31.90	20.35	3.44	.11	2.27	.08	1.08	.92	.22		1.53	.07	.12
5.	33.27	24.41	.74	.18	2.19	.26		1.99	.06	.08	2.03	.16	
6.	27.65	20.10	1.15		1.45			1.81	.05	.03	1.14	.07	
7.	21.61	12.91	1.71	.11	2.05	.18	.54	.81	.18		.80		
8.	31.16	18.10	4.23		1.89	.39	1.55	.46	.05	.10	1.82	.05	.10
9.	31.01	20.63	.86	.33	2.32	.15		2.08			2.91		.17
10.	43.23	31.91	.73	.29	2.56	.20	.99	1.39	.12	.18	1.84	.11	.23
11.	29.01	14.42	3.35	.32	2.65	.32		1.94			1.77	.18	
12.	29.20	18.75	2.66		2.21	.07	.85		1.09		2.05		
13.	29.56	15.90	5.14	.19	2.03	.28	.77	.83	.07		1.95	.05	.16
14.	28.75	17.89	1.44		1.95	.07	.89	.71	.08		2.50		
15.	25.35	17.91	.55	.12	1.53	.04	1.01	1.01	.07		1.71	.07	
16.	28.41	19.17	2.22		1.82	.39	.82	.94			1.44		.33
17.	36.00	22.60	2.82	.22	2.53	.14	1.05	1.11		.01	2.64	.29	
18.	35.70	25.17	1.60		2.43	.08		2.71			2.30		
19.	28.90	18.16	.98	.19	1.97	.04	1.37	.82			2.08		.11
20.	23.16	16.58	.49		1.19	.15	.55	.36	.04		2.29	.03	.21
21.	24.50	16.90	3.08	.05	1.44	.05		.38	.09	.05	.94	.05	.04
22.	8.94	6.63	.11		.37			.53	.13	.02	.37	.03	
23.	12.85	3.69	3.78	.08	1.92	.08					1.27		.08
24.	15.26	9.87	1.41	.23	.96		.10	.22	.01	.01	1.03	.07	.14
25.	31.00	21.67	2.45		1.53		.11	.11	.03	.05	2.04	.04	.25
26.	32.67	18.37	5.47	.19	1.92	.03	.66	.99	.04	.03	1.45	.05	.18
27.	26.96	15.11	2.82		1.95		1.64		.48		1.25		.12
28.	30.30	19.77	1.19	.39	2.19	.20	1.14				2.28		1.38
29.	29.50	18.21	.86		2.06	.09	2.01		.33		1.51	.01	.08

TABLE VII (*Continued*)

The cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor. Fifty-seven cities, for the school year 1902–03.

Number of City.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Expressage.	Printing and Advertising.	Telegraph Postage etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
1.	1.88	.01	.25	.73		.16	.11	.02	.10	.16	.56	.47	.02
2.	1.50	.05	.05	.83					.01		.14	.07	
3.	1.09									1.28	.15		
4.	1.06	.05	.02			.05	.04	.01	.09		.11	.27	
5.	.33		.11	.34					.01		.11	.16	.08
6.	1.09			.41		.05	.04	.01	.01			.19	
7.	1.43		.02	.45	.19	.03	.11	.01			.06		
8.	1.17		.05	.56	.19	.04	.08	.03	.03		.13	.08	.05
9.	.05		.05						.03	1.42			
10.	2.29		.05	.19			.10		.01				
11.	1.24	.14		.26	.26	.04	.04	.01	.05	1.96	.07		
12.	1.03	.07	.04	.28		.04			.06				
13.	.77	.04	.03	.14	.48	.05	.05	.01		.37	.14	.06	.01
14.	2.02	.03	.03	.46		.10	.05			.17	.21	.10	.05
15.	.69	.17	.03	.22		.03	.06	.01	.01		.02	.07	.01
16.	1.14		.05	.10									
17.	1.43		.03	.36		.07	.12	.01	.02	.08	.12	.25	.07
18.	.98		.05	.25		.04	.08	.02	.02				
19.	1.64		.07	.82		.05	.05	.01	.01		.16	.35	
20.	.85	.09		.07			.05		.01	.22			
21.	.94				.14	.02	.01	.01	.01		.19		.07
22.	.59	.01	.02			.01	.06					.08	
23.	.90		.06	.03	.40				.01		.19	.08	.26
24.	.45		.03		.32		.05	.01	.02	.19		.13	
25.	1.83		.08		.25	.01	.25	.01	.14			.05	.11
26.	1.12	.19	.10	.03	.44	.03	.10	.02	.01			.17	1.05
27.	.63	.54	.10		.03		.08			1.18	.24	.44	.27
28.		.14	.13						.05	.89	.23	.35	
29.		3.15	.07	.36		.14	.11					.35	.18

TABLE VII (*Continued*)

The cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor. Fifty-seven cities, for the school year 1902–03.

Number of City.	Total.	Teaching.	Supervision.	Clerk.	Janitors.	Truant Officers.	Text-Books.	Supplies.	Janitors' Supplies.	Board of Education and Supervisors' Supplies.	Fuel.	Light and Power.	Water.
30.	37.32	25.25	1.01	.27	2.36	.34	.64	1.04	.26		1.85	.07	
31.	27.90	15.75	.79	.28	1.84	.32		1.56			3.49	.09	
32.	34.49	19.07	1.29	.30	1.93	.17	.37	.64	.13	.64	2.25	.25	
33.	24.85	16.78	3.18	.35	1.52	.09		.17	.04	.03	1.24	.04	
34.	35.96	23.15	1.56	.44	2.92	.56	.02	.33	.22	.09	3.61	.08	
35.	24.52	17.87	.49	.17	1.60	.18	.02		.10	.06	1.39	.07	
36.	31.94	18.88	5.54	.25	1.11	.10		.21	.07	.02	1.66	.22	.18
37.	19.26	11.40	3.25	.39	1.01	.09		.40			1.15		
38.	23.56	15.21	1.75		.91	.40	.05	.10	.15	.05	1.30		
39.	32.01	19.94	3.55	.31	1.67	.25		.56	.25			2.11	
40.	34.79	21.90	1.42	.44	1.38	.29	.60	1.45	.11			3.06	.25
41.	24.65	15.99	1.03	.46	1.13	.02		1.40	.04	.01	1.49	.12	.22
42.	28.50	15.47	4.43	.32	1.49	.32	1.43	1.12	.16			1.59	.32
43.	26.09	17.00	.92	.17	1.73	.21	.49	.45	.18	.03	2.31	.10	.15
44.	26.18	16.69	1.19	.16	1.58	.23	.31		.03	.40	2.62	.13	.21
45.	28.53	19.14	.64	.05	1.53	.19	1.55	.35	.08	.05	1.08	.26	
46.	41.52	25.53	4.71	.31	1.91	.21	1.19	.72	.39	.19	1.63	.05	.14
47.	20.71	5.78	3.37	.75	1.75	.18	.69		.57		3.34	.12	.04
48.	22.75	13.29	2.23	.25	1.36	.30	.97	.31	.05	.04	1.39	.05	.12
49.	22.20	14.20	2.69	.15	.89	.30	1.15	.22	.15	.08	1.22		.04
51.	32.05	21.05	4.45	.32	1.76	.21	.59	.15	.15	.02	1.79	.04	
52.	26.39	13.81	1.75	.19	1.84	.16	.79	.92	.16	.12		1.19	
53.	30.61	20.49	3.74	.21	2.11			1.49		.29		.85	
54.	54.72	30.60	5.87	.69	3.05		2.11	2.50	.43	.18	2.72	.58	
55.	20.50	12.61	.69	.11	1.09	.23		1.14			1.14	.11	
56.	28.01	15.33	4.56	.22	2.35	.08	.45	.52	.33	.47	1.22	.11	
57.	51.25	33.20	5.09	.96	2.42		1.34	2.23	.11	.11	2.01	.22	
58.	21.51	13.55	2.08	.14	1.17			1.39	.28	.14	.69	.06	.10

TABLE VII (*Continued*)

The cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor. Fifty-seven cities, for the school year 1902–03.

Number of City.	Repairs.	Rent.	School Census.	Transportation of Pupils.	Insurance.	Freight and Express.	Printing and Advertising.	Telegraph, Postage, etc.	Telephones.	Miscellaneous Expenses.	Furniture (not put in new buildings).	Apparatus.	Reference and Library Books.
30.	2.75		.02			.31	.22		.12		.34	.07	.42
31.	1.79	.10	.11		.08		.15		.04	1.01	.35	.18	
32.	3.67		.13		.18	.06	.27		.10	1.29	.86	.21	.65
33.	1.17		.07		.06	.01	.06	.03		.02			
34.	.52		.19	.18	.52		.44		.07	.17	.61	.23	
35.	.68		.04		.09	.02	.16	.02	.06	.99	.14	.16	.21
36.	.72		.10		.33	.06	.02	.02	.08	1.57	.41	.19	.27
37.	.45				.04		.11			.63		.33	
38.	2.32		.05		.27	.02	.14	.02		.31	.05	.18	.29
39.	1.36				.06		.59		.04				1.36
40.	1.21		.05		.51	.03	.70			.45	.18	.76	
41.	.04	.45	.06	.03	.17	.05	.06	.04	.05	1.27	.15	.36	
42.	.80				.32	.02	.08	.02	.05		.32	.16	.10
43.	.65	.04	.11	.07	.01	.01	.13	.02	.01	.69	.17	.22	.17
44.	1.12	.60			.32	.05	.07	.01			.15	.18	.10
45.	1.98				.32	.04	.25		.03	.68	.13	.05	.14
46.	1.07	1.49		.11		.08	.22	.04	.19	.04	.58	.23	.25
47.	2.03	.14			.37		.23		.07		.42	.04	.13
48.	.34	.56	.06		.11	.04	.36	.01		.73	.08	.05	.06
49.	.29		.05		.13	.04	.03	.01		.06	.20	.20	.11
51.	.59		.02		.29	.02	.06	.01	.05		.03	.25	.25
52.	3.95				.31	.18	.21	.03		.47		.26	.05
53.	1.00										.42		
54.	2.30			.25	.43	.20	.25	.04	.20	.66	.25	1.21	.20
55.	.57									2.01	.29	.29	.23
56.	1.50				.16		.08		.07	.25	.17	.06	.11
57.	2.23				.11	.11	.13	.07			.45	.22	.22
58.	1.12	.24			.03		.03		.06			.03	.42

TABLE VIII

The cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor. Thirty of the cities which reported in 1902–03 reporting for the year 1903–04.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
5.	34.08	25.51	24.77	.74	2.31	1.29	2.75	.33
6.	24.26	15.80	14.66	1.14	1.61	1.63	1.91	2.18
8.	32.36	23.65	22.58	1.07	1.86	1.83	1.78	1.12
13.	34.21	25.52	20.91	4.61	1.94	1.82	2.25	.82
14.	28.79	19.96	18.58	1.38	2.28	1.63		1.36
15.	24.65	18.71	14.88	3.83	1.57	1.36	1.44	.69
16.	28.18	21.32	19.23	2.09	1.90	1.51	1.99	.82
20.	23.06	17.40	16.71	.69	1.26	1.21	1.94	.55
27.	26.25	18.23	14.57	3.67	2.07	1.62	.58	.97
28.	29.38	20.63	19.50	1.13	2.08	.87	3.94	
29.	24.72	15.54	15.78	.76	2.08	1.97	1.49	1.26
30.	38.70	26.99	26.00	.99	2.42		1.67	3.57
31.	30.92	21.17	20.37	.80	2.04		3.12	2.82
32.	28.00	20.11	15.52	4.59	2.04	.78	1.69	1.02
34.	31.54	21.62	20.23	1.39	3.37		1.13	1.61
35	29.93	23.40	21.75	1.65	1.43	.14	1.90	1.47
36.	31.70	26.49	21.20	5.29	1.16		2.04	.04
37.	20.71	15.76	12.15	3.61	1.08		1.63	.94
39.	28.78	21.46	17.80	3.66	1.59			1.15
40.	31.14	21.35	15.72	5.63	1.14	2.03		1.17
41.	25.34	17.94	14.37	3.57	1.15	1.40	1.86	.91
42.	29.09	20.32	15.72	4.60	1.50	2.68	1.38	.98
43.	30.49	22.94	22.01	.93	1.92	.92	.94	.89
45.	29.07	21.22	19.38	1.84	1.67	1.61	1.18	1.47
48.	27.72	19.66	15.67	3.99	1.51	1.97	1.41	1.07
52.	29.02	19.08	17.45	1.63	2.30	2.11	1.09	1.37
54.	48.22	30.98	25.20	5.78	2.56	8.70		1.36
55.	17.91	13.19	12.07	1.12	1.06	1.09	.84	.22
56.	30.93	22.22	20.85	1.37	2.58	1.30	1.36	1.12
57.	52.48	39.10	34.07	5.03	2.94	3.22	2.07	2.18

TABLE IX

The average cost per pupil for two school years, 1902–03 and 1903–04. This table is derived from Tables VII and VIII which are based on the average number of pupils in daily attendance. Thirty cities.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
5.	33.67	25.33	24.59	.74	2.25	1.64	2.39	.33
6.	25.95	18.52	17.38	1.14	1.53	1.72	1.52	1.63
8.	31.76	22.99	20.34	2.65	1.87	1.92	1.80	1.14
13.	31.88	23.28	18.40	4.88	1.98	1.71	2.10	.79
14.	28.77	19.64	18.23	1.41	2.11	1.62	2.48	1.69
15.	25.00	18.58	16.39	2.19	1.55	1.69	1.57	.69
16.	28.39	21.35	19.20	2.15	1.86	1.63	1.71	.98
20.	23.11	17.23	16.64	.59	1.22	1.06	2.12	.70
27.	26.10	18.08	14.84	3.25	2.01	1.63	.91	.85
28.	29.84	20.79	19.63	1.16	2.13	1.00		
29.	27.11	17.80	16.99	.81	2.07	1.99	1.50	1.26
30.	38.01	26.62	25.62	1.00	2.39		1.76	3.16
31.	29.41	18.85	18.06	.79	1.94		3.30	2.30
32.	31.24	20.23	17.29	2.94	1.98	.89	1.97	2.34
34.	33.75	25.16	21.69	1.47	3.14		2.37	1.06
35.	27.22	20.88	19.81	1.07	1.51		1.14	1.07
36.	31.82	25.45	20.04	5.41	1.13		1.85	.38
37.	19.98	15.20	11.77	3.43	1.04		1.39	.69
39.	30.39	22.47	18.87	3.60	1.63		1.99	1.25
40.	32.96	22.33	18.81	3.52	1.26	2.03	2.45	1.19
41.	24.99	17.48	15.18	2.30	1.14	1.40	1.67	.47
42.	28.79	17.09	15.58	4.51	1.49	2.61	1.45	.89
43.	28.29	20.42	19.50	.92	1.82	.93	1.62	.77
45.	28.80	20.50	19.26	1.24	1.60	1.75	1.13	1.72
48.	25.26	17.59	14.48	3.11	1.43	1.62	1.40	.70
52.	27.70	17.32	15.63	1.69	2.07	1.91	1.00	2.66
54.	51.47	33.72	27.90	5.82	2.86	6.15	2.32	1.83
55.	19.20	13.24	12.34	.90	1.07	1.11	.99	.39
56.	29.47	21.05	18.09	2.96	2.46	1.13	1.29	1.31
57.	51.86	38.69	33.63	5.06	2.68	3.39	2.04	2.20

EXPLANATION OF TABLES

Table I gives the gross amount spent for maintenance and operation for each city, and the amounts spent for each of the several items of the budget. The amounts spent for all items of expenditure should, of course, when added, give the gross amount spent, which is scored on the table as "Total." The blanks which are found indicate that the city reported nothing under this head, or that this item is included under one head with some other, in which case they are underscored, if possible. The first line of Table I reads as follows: City number one spent $76,252 for maintenance and operation, of which $47,712 were spent for teaching, $2200 for supervision, $392 for a clerk, $5032 for janitors' salaries, $300 for truant officers, $3919 for text-books, etc. The data given in Table I is for the school year 1902–1903 for fifty-eight cities of from 10,000 to 50,000 inhabitants, located in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey.

Table II gives the same information as Table I for thirty of the same cities for the school year 1903–1904.

Table III reduces each item of the budget to per cent. of the total. The first line reads: In city number one 62.6 per cent. is spent for teaching, 2.9 per cent. for supervision, .5 per cent. for clerk, 6.6 per cent. for janitors' salaries, etc. If the sum of the per cents for all of the items is taken, they should give 100 per cent. This table gives information for fifty-eight cities for the school year 1902–1903, as noted in Table I.

Table IV gives the same information as Table III for thirty of the same cities for the school year 1903–1904.

Table V is derived from Tables III and IV by finding the average for two years. Thus, for city number five, for the first year, teaching and supervision amounted to 75.9 per cent. of the total (see Table III, line 5, first and second items); for the same city for the second year this item was 74.9 per cent. of the total (see Table IV, first line, items one and two); the average of the two, 75.4 per cent., gives the first figure of Table V. In like manner, janitors' salaries, for the first and second years respectively, for city number five amount to 6.6 and 6.8 per cent. This gives us our figure, 6.7 per cent., for janitors' salaries for city number five in Table V (see Table V, first line, column three).

Table VI gives the cost per pupil expressed in dollars and cents. The number used as a divisor here is the figure half-way between the average number of pupils in daily attendance and the average daily enrolment, or average number belonging, as it is sometimes expressed. As stated elsewhere in the text, it is my opinion that this is a better figure than either average daily attendance or average daily enrolment. The only reason that this basis is not used throughout the study is because the figures for average daily enrolment could not be secured for a number

of the cities. In the section giving coefficients of correlation will be found a number of coefficients which were worked out on this basis from this table. This table gives data for forty-eight cities for the school year 1902–1903. The first line reads as follows: City number one spent $34.18 per pupil for the maintenance and operation of schools, of which $21.38 per pupil was spent for teaching, $0.99 per pupil for supervision, $0.17 per pupil for clerk, $2.26 per pupil for janitors' salaries, etc.

Table VII gives the cost per pupil expressed in dollars and cents. The average number of pupils in daily attendance is used as the divisor in this case. The first line reads as follows: City number one spent $35.64 per pupil for the maintenance and operation of schools, of which $22.30 per pupil was spent for teaching, $1.03 per pupil for supervision, etc. This table gives data for fifty-seven cities for the school year 1902–1903.

Table VIII gives the same information as Table VII, calculated on the same basis for thirty of these cities for the school year 1903–1904. This table is read the same as Table VII.

Table IX gives the average cost per pupil for thirty cities for two years, the school years 1902–1903 and 1903–1904, for the principal items of expense. This table is derived from Tables VII and VIII, which are based on the average number of pupils in daily attendance. The first line reads as follows: In city number five the average for two years of the cost per pupil for maintenance and operation of schools was $33.67 (1902–1903, $33.27; and 1903–1904, $34.08); for teaching and supervision the average was $25.33; for teaching alone, $24.59, etc.

Throughout the tables a number written across the space between the columns indicates that this number applies to the two adjoining columns taken together, and similarly an underscore running across three or more columns indicates that the number applies to these columns collectively.

VARIABILITY

In the tables given above, which compare the different items of the school budget on a common basis, the most striking thing to be noticed is the variability which exists among the cities. It is the purpose of this section to consider somewhat minutely the problem of variability in connection with the apportionment of school moneys among the several items of the budget. It may not be out of place here to call attention to the ambiguity if not the positive misrepresentation of facts which results when, as in most cases where such data have been collected, the average alone is given to represent the facts. Of course, if one accepts

the average as meaning simply that the sum of all the cases is divided by their number, no harm is done; but if one takes the average as indicative of the general tendency or as a measure applicable to the majority of the cases, he may be most completely deluded. The average expenditure per pupil for cities Nos. 22, 23, 54, and 57 for the first year (see Table VII) is $31.94. They spent $8.94, $12.85, $54.72, and $51.25 respectively per pupil. The average in this case does not correctly represent the group nor any particular city within the group. The thing that interests us in the measurement of any trait in a group is the range or limits within which all of the cases lie, and the grouping of the cases within these limits.

If we consider the facts found in the tables already given (Tables I to IX), we find that cities differ greatly not only in the amount per pupil which they spend for the maintenance and operation of their schools, but also that even where cities spend about the same amount per child, the distribution of this money among the several items of the budget is very different. Again, when we consider simply the distribution of the money that is spent, regardless of the amount, as is done in the table which gives the per cent. which each item is of the total cost of maintenance and operation, we find that there is the greatest variability in practice. One city spends 44 % of the cost for maintenance and operation (see Table III) for teaching and supervision, while another spends 82 % for the same purposes; the janitors receive from 3 % to 14 % of the money used to run the schools; supervision costs one city 1 % and another city 17 % of the whole amount spent; salaries for teaching vary from 27 % to 73 % of the budget. It would seem impossible that the money is properly distributed in every case when we consider this remarkable variability in practice.

The undistributed expenditure reported under the head "Miscellaneous" needs to be considered in any argument concerning the variability in any item as reported by several cities. It is possible that a very large part of the amount thus reported properly belongs to some one of the items for which a report has been made. It may be that the item teaching, supervision, fuel, janitors' salaries, repairs, or some other would be greatly increased if the report had properly distributed the money. It was to guard against any such obscurity that the attempt was

made in this study to secure a complete distribution of expenditures in the cities from which information was received, and, as has been noted above, this attempt was to a remarkable degree successful. Thirty cities out of fifty-eight for the first year report nothing under this head; sixteen reported less than 2 %, ten others less than 5 %, and the two remaining reported 5.14 % and 6.75 %, respectively, as unclassified expenditures. For the second year, of thirty cities reporting, eighteen report nothing under "Miscellaneous"; and of the remaining twelve, eight report 1 % or less; three, 2 %; and one, 3.76 % under this head. It is quite evident, I believe, that the miscellaneous item is so small, even where it occurs, that it may not be used as an explanation of the variability which occurs in all items of expenditure; and I feel that it is safe to say that the accurate distributions of the amounts reported under this head would not alter the conclusions reached in this paper.

It might be argued that the great variability is due to the fact that the cities for which data are given are not comparable, that one has at its command a much larger amount of money in proportion to the number of children to be educated than another, and hence the variability. It is true that rightly or wrongly some of these cities are much better provided with money than others, but that does not seem to be the cause of the great variability in the apportionment of the money which they do have. Take, for example, cities Nos. 3, 6, 19, 21, 44, and 56. From the information given in Tables I and III, the following table may be built up:

No. of City.	Total Expense.	No. of pupils in daily attendance.	Cost per pupil.
3.	$52,708	1,876	$28.06
6.	50,613	1,826	27.65
19.	52,870	1,831	28.90
21.	52,178	2,127	24.50
44.	48,410	1,850	26.18
56.	50,192	1,794	28.01

Per cent. spent for each item:

No. of City.	Teaching.	Supervision.	Janitors.	Fuel.	Text-books and Supplies.	Repairs.
3.	68.2	4.	7.1	4.7	6.1	3.9
6.	72.9	4.2	5.3	6.1	6.6	4.
19.	62.9	3.4	6.8	7.2	7.5	5.7
21.	69.1	12.6	5.9	3.8	1.5	3.8
44.	63.8	4.6	6.1	10.	1.2	4.3
56.	54.6	16.3	8.4	4.4	3.4	5.3

The variation found cannot be due in these cases to a large undistributed amount, for five of these cities distributed their expenditures in the special reports received from them according to the classification given, without finding it necessary to report anything under the head "Miscellaneous," and the other (No. 56) reports only nine-tenths of 1 % under this head (see Table III).

In these cities the amount of money available and the number of pupils to be provided for do not differ very much. We might expect that if there were any principle which controlled the apportionment of money, or if the money were apportioned in the best way, the proportion of the whole cost of maintenance and operation spent for any of the principal items would be approximately the same in these cities. By glancing at the table, however, we see here the same marked variability which is found when the whole number of cities is considered. Not that there is quite so great a range, which would be very unusual because of the limited number of cases, but that the distribution of money among the several items seems not to be determined by any common principle.

It seems strange that of two cities (No. 6 and No. 56) which spend respectively $50,613 for 1826 pupils and $50,192 for 1794 pupils, one should spend 72.9 % of its money for teaching while the other spends 54.6 % for the same purpose. Of course, if we combine the items of teaching and supervision, they do not differ so much (77.1 % and 70.9 %), but if this combination of items is made throughout for the cities of this table, we have a variation in the proportion spent for teaching and supervision of from 66.3 % to 81.7 % of the total (see Nos. 19 and 21). For the other items in these cities in which the conditions seem to be so much alike, the table shows the same variability. Janitors' salaries vary from 5.3 % to 8.4 %; fuel, from 3.8 % to 10 % (in cities which spend respectively $24.50 and $26.18 per pupil); text-books and supplies, from 1.2 % to 7.5 %; and repairs from 3.8 % to 5.7 % of the total.

It is, indeed, strange if 44 % of the cost of maintenance and operation can in one city provide for proper teaching and supervision (see Table III.), that in another city, which spends more per pupil, it requires 82 % of the total for this item. It would seem that owing to tradition, to poor business management, or

to some other more invidious cause, the money spent is not always spent to the best advantage. It seems possible, also, that the superintendent whose attention is called to the wide variation in any one item of his budget, might be led to investigate the matter, in order to determine whether there is any good reason for such deviation from the ordinary or normal condition of affairs.

A more careful study of the variability of the several items of the budget shows that in many cases a large expenditure for one item is accompanied by a small expenditure for another. Again, in other cases large expenditures in one item seem to be accompanied by large expenditures in others and small expenditures in some by small expenditures in others. One has but to examine carefully the tables to have suggested the possibility of significant relationships. In another section I shall consider this matter more fully and measure a number of these relationships exactly by means of the Pearson Coefficient of Correlation.

There are three ways in which we shall express the variability in order to get as clear an idea as is possible of the lack of uniformity and in order to suggest the problems which arise because of this variability.

From the tables already given (see Tables I to IX), it is possible for us to make out frequency tables like those which follow. In these tables the first column gives the amount of money spent, or the per cent. of the total which the item is, and the second column gives the number of instances where this is true. They give all the facts concerning variability; not only the range or limits within which all of the cases lie, but also the exact placing of every case.

EXPLANATION OF TABLES

Tables X, XI, XII, and XIII give information for the cities reporting for the school year 1902–1903.

Table X reads as follows: one city spends 27 % for teaching; one, 49 %; one, 52 %; one, 53 %; two, 54 %, etc.

Table XI reads as follows: two cities spend 1 % for supervision; eleven spend, 2 %; seven, 3 %, etc.

Reading the first lines of Tables XII and XIII, we find that four cities spent 3 % of the budget for janitors' salaries, and that six cities spent 3 % for fuel.

The per cent. of the total expenditure for maintenance and operation which is spent for teaching, supervision, janitors' salaries, and fuel. Fifty-eight cities, reporting for the school year 1902–03.

TABLE X

Teaching. Per Cent.	Frequency.
27	1
28	1
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0
37	0
38	0
39	0
40	0
41	0
42	0
43	0
44	0
45	0
46	0
47	0
48	0
49	1
50	0
51	0
52	1
53	1
54	2
55	2
56	3
57	0
58	3
59	2
60	0
61	3
62	6
63	6
64	6
65	3
66	2
67	3
68	2
69	2
70	1
71	2
72	1
73	4

TABLE XI

Supervision. Per Cent.	Frequency.
1	2
2	11
3	7
4	6
5	1
6	2
7	5
8	0
9	5
10	3
11	4
12	3
13	2
14	0
15	1
16	4
17	2

TABLE XII

Janitors' Salaries. Per Cent.	Frequency.
3	4
4	6
5	15
6	19
7	7
8	3
9	2
10	0
11	0
12	0
13	0
14	1

TABLE XIII

Fuel. Per Cent.	Frequency.
3	6
4	12
5	10
6	11
7	4
8	3
9	3
10	2
11	0
12	1
13	0
14	0
15	0
16	2

TABLES OF FREQUENCY

The per cent. of the total expenditure for maintenance and operation which is spent for teaching, supervision, janitors' salaries, and fuel. Average for two years, thirty cities reporting for the school years 1902–03 and 1903–04.

TABLE XIV

Teaching. Per Cent.	Frequency.
54	3
55	2
56	1
57	2
58	0
59	2
60	2
61	1
62	3
63	1
64	4
65	2
66	2
67	2
68	1
69	0
70	0
71	0
72	2
73	1

TABLE XV

Supervision. Per Cent.	Frequency.
2	4
3	4
4	5
5	0
6	1
7	1
8	2
9	2
10	2
11	3
12	2
13	0
14	0
15	2
16	0
17	2

TABLE XVI

Janitors' Salaries. Per Cent.	Frequency.
3	2
4	1
5	10
6	11
7	4
8	1
9	1

TABLE XVII

Fuel. Per Cent.	Frequency.
3	4
4	3
5	8
6	9
7	2
8	2
9	0
10	0
11	1

TABLES OF FREQUENCY

Cost per pupil expressed in dollars, the average daily attendance being used as the basis of calculation. Fifty-eight cities, reporting for the school year 1902–03.

Table XVIII		Table XIX		Table XX		Table XXI		Table XXII	
Total Cost per Pupil.		Teaching and Supervision.		Janitors' Salaries.		Fuel.		Text-Books and Supplies.	
Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.
8	1	6	1	.4	1	.4	1	.2	2
9	0	7	1	.5	0	.5	0	.3	1
10	0	8	0	.6	0	.6	0	.4	1
11	0	9	1	.7	0	.7	1	.5	0
12	1	10	0	.8	0	.8	1	.6	0
13	0	11	1	.9	2	.9	1	.7	1
14	0	12	0	1.0	3	1.0	2	.8	0
15	1	13	1	1.1	4	1.1	3	.9	2
16	0	14	2	1.2	0	1.2	5	1.0	2
17	0	15	3	1.3	2	1.3	4	1.1	2
18	0	16	3	1.4	3	1.4	3	1.2	1
19	1	17	6	1.5	5	1.5	2	1.3	3
20	2	18	3	1.6	2	1.6	3	1.4	1
21	2	19	8	1.7	3	1.7	3	1.5	2
22	2	20	3	1.8	4	1.8	3	1.6	4
23	2	21	5	1.9	8	1.9	1	1.7	3
24	4	22	1	2.0	3	2.0	5	1.8	1
25	1	23	5	2.1	3	2.1	0	1.9	3
26	4	24	4	2.2	2	2.2	3	2.0	5
27	2	25	3	2.3	4	2.3	2	2.1	2
28	8	26	2	2.4	2	2.4	0	2.2	0
29	4	27	0	2.5	2	2.5	0	2.3	1
30	2	28	0	2.6	1	2.6	2	2.4	0
31	5	29	0	2.7	0	2.7	1	2.5	1
32	3	30	1	2.8	0	2.8	0	2.6	0
33	1	31	0	2.9	1	2.9	1	2.7	0
34	2	32	1	3.0	1	3.0	0	2.8	0
35	3	33	0			3.1	0	2.9	0
36	1	34	0			3.2	0	3.0	1
37	1	35	0			3.3	1	3.1	0
38	0	36	1			3.4	1	3.2	0
39	0	37	0			3.5	0	3.3	0
40	0	38	1			3.6	1	3.4	0
41	1					3.7	0	3.5	1
42	0					3.8	0	3.6	0
43	1					3.9	0	3.7	0
44	0					4.0	0	3.8	0
45	0					4.1	0	3.9	0
46	0					4.2	0	4.0	0
47	0					4.3	0	4.1	0
48	0					4.4	0	4.2	0
49	0					4.5	0	4.3	0
50	0					4.6	0	4.4	0
51	1					4.7	1	4.5	0
52	0							4.6	1
53	0								
54	1								

Cost per pupil expressed in dollars, average for two years, the average daily attendance being used as the basis of calculation. Thirty cities, reporting for the school years 1902–03 and 1903–04.

TABLE XXIII		TABLE XXIV		TABLE XXV		TABLE XXVI		TABLE XXVII	
Total Cost per Pupil.		Teaching and Supervision.		Janitors' Salaries.		Fuel.		Text-Books and Supplies.	
Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.	Dollars.	Frequency.
19	2								
20	0	13	1	1.0	2	.9	2	.8	1
21	0	14	0	1.1	2	1.0	1	.9	1
22	0	15	1	1.2	2	1.1	1	1.0	2
23	1	16	0	1.3	0	1.2	1	1.1	2
24	1	17	6	1.4	2	1.3	1	1.2	0
25	3	18	4	1.5	3	1.4	2	1.3	0
26	1	19	1	1.6	2	1.5	3	1.4	1
27	3	20	5	1.7	0	1.6	3	1.5	0
28	5	21	2	1.8	3	1.7	2	1.6	6
29	3	22	3	1.9	3	1.8	2	1.7	3
30	1	23	1	2.0	3	1.9	2	1.8	0
31	4	24	0	2.1	2	2.0	1	1.9	3
32	1	25	3	2.2	1	2.1	2	2.0	1
33	2	26	1	2.3	1	2.2	0	2.1	0
34	0	27	0	2.4	1	2.3	3	2.2	0
35	0	28	0	2.5	0	2.4	2	2.3	0
36	0	29	0	2.6	1	2.5	0	2.4	0
37	0	30	0	2.7	0	2.6	0	2.5	0
38	1	31	0	2.8	1	2.7	0	2.6	1
39	0	32	0	2.9	0	2.8	0	2.7	0
40	0	33	1	3.0	0	2.9	0	2.8	0
41	0	34	0	3.1	1	3.0	0	2.9	0
42	0	35	0			3.1	0	3.0	0
43	0	36	0			3.2	0	3.1	0
44	0	37	0			3.3	1	3.2	0
45	0	38	1					3.3	1
46	0							3.4	0
47	0							3.5	0
48	0							3.6	0
49	0							3.7	0
50	0							3.8	0
51	2							3.9	0
								4.0	0
								4.1	0
								4.2	0
								4.3	0
								4.4	0
								4.5	0
								4.6	0
								4.7	0
								4.8	0
								4.9	0
								5.0	0
								5.1	0
								5.2	0
								5.3	0
								5.4	0
								5.5	0
								5.6	0
								5.7	0
								5.8	0
								5.9	0
								6.0	0
								6.1	1

Tables XIV to XVII, inclusive, are frequency tables based upon the average of the first and second years' figures from thirty cities. It will be noticed that the range is somewhat less, due largely to the fact that there are fewer cases. These tables are read precisely as Tables X to XIII, illustrated above.

The tables for the first year's figures alone are, of course, less reliable than those which give the average for two years, so far as any one city is concerned. However, the greater variability found in these figures for the first year which does not appear when the average for the two years is taken is due largely to the fact that many of the cities which give the extreme variation have not yet reported for two years. In Table No. X, for example, the cities reporting 27 %, 28 %, 49 %, and 52 %, respectively, for teaching, are cities Nos. 47, 23, 11, and 52, none of which reported for the second year (see Tables III and IV). The variability for the first year's figures is, simply because there are more cases, more nearly a correct representation of the facts of variability, we believe, than the average of the two years where many of the extreme cases are not found. It is remarkable that so small a proportion as 27 % should be devoted to teaching in one case, when other cities use 73 % of their funds for this purpose,—that some cities should give 2.7 times as great a proportion for teaching as others.

The variation in the proportion which is spent for supervision is not less remarkable. Here the cities seem to divide themselves into groups—those which spend a comparatively large proportion of their money for supervision, and those in which this item is allowed a smaller share of the money. One feels that supervision which costs 17 % of the money available for schools should produce remarkable results in the way of saving time and energy for teachers and pupils, if it is to be justified when compared with other cities in which 2 % of the budget seems to secure satisfactory supervision.

The range for janitors' salaries (Table XII) may indicate a real difference in the care of school buildings, or, in rare instances, perhaps some connection between ward politics and the janitors' position. Leaving out the most extreme case, it seems rather remarkable that in some instances one dollar out of every eleven available for the maintenance and operation of the schools should be spent for the care of buildings.

That fuel should be allowed in some cities three times as great a proportion of the money spent as in others (see Table XIII) would not seem strange if our cities were found in sections of the country with very different climatic conditions; but that four or even five times as much should be necessary under conditions which are not greatly different seems preposterous.

Tables XIV to XVII, which are based on the average for two years, give the most accurate information we have for the thirty cities which reported two years. The limits within which the cases lie are, as has already been noted, somewhat smaller than in the case of the first year's figures considered alone. This is due largely to the fact that we have a smaller number of cases. The variability is, nevertheless, sufficiently striking with a range of from 54 % to 73 % for teaching, from 2 % to 17 % for supervision, from 3 % to 9 % for janitors' salaries, and from 3 % to 11 % for fuel.

Tables XVIII to XXII give the variability for the cost per pupil for some of the principal items of the budget. The cost per pupil as given here is based on the average daily attendance (see Table VII).

Table XVIII reads as follows: one city spent for maintenance and operation per pupil in attendance, $8.00; one city, $12.00; one city, $15.00; one city, $19.00; two cities, $20.00; two cities, $21.00, etc.

Tables XXIII to XXVII give the variability for some of the principal items of the budget on the cost per pupil basis, the average amount spent per pupil for two years being used (see Table IX). Table XXIII, for instance, reads as follows: the average amount for two years spent for maintenance and operation per pupil in attendance for two cities was $29.00; one city, $23.00; one city, $24.00; three cities, $25.00, etc.

In the tables given above, we have an expression of the variability in terms of the amount of money spent. We sometimes think of the cities in the region covered by this study as spending a very large amount for public education. The average inhabitant, if not the school officers themselves, of any of these cities will probably say that their school system is quite as good as any other, or at least as good as the average. As a matter of fact, we find a great variability in the total amount per pupil

spent, as well as in the amount spent for various items. No one believes that the city which spends $54.00 per pupil furnishes an education six and three-quarter times as good as the city which spends only $8.00 per pupil. On the other hand, it hardly seems possible that the opportunity for education in the eight-dollar city can be equal to that found in the fifty-four-dollar city. Teaching and supervision which cost $6.00 per child are hardly likely to be as good as those which cost three, four, five, or even six times as much. No argument based upon the difference in the cost of living could account for so great a difference in the cost of instruction. Either the teachers receive a very much smaller salary in the cities which pay a relatively small amount per pupil, or they have much larger classes to instruct, or both conditions taken together explain the variability.

One may infer that the number of children determines the number of seatings which must be furnished, if not the number and size of buildings; and yet janitors' salaries may cost from 40 cents to $3.00 per pupil, and fuel from 40 cents to $4.70 per pupil.

If we neglect the cases where a very little is spent for text-books and supplies,—the cases where they are not furnished free to pupils,—we still find that some cities spend three or four times as much per pupil as others for these articles. It seems rather remarkable that the real value of books and supplies furnished to pupils should vary so much; and even if this were the case, one might question whether the money is spent to best advantage in those cities which spend the larger amounts. Might not a part of this money have been spent to greater advantage in some other way?

The limits within which all of the cases lie are significant, but are not so true a measure of the variability of the group as are the limits within which the middle 50 % of the cases lie. A single exceptional case may double the range within which all of the cases lie, but manifestly this does not double the variability of the group. This figure, which we call 2 Q, is found by counting in from both the upper and lower limits until 25 % of the cases have been covered, and then finding the range within which the remaining 50 % of the cases lie. For instance, in Table X, in which there are 58 cases, we count off from the

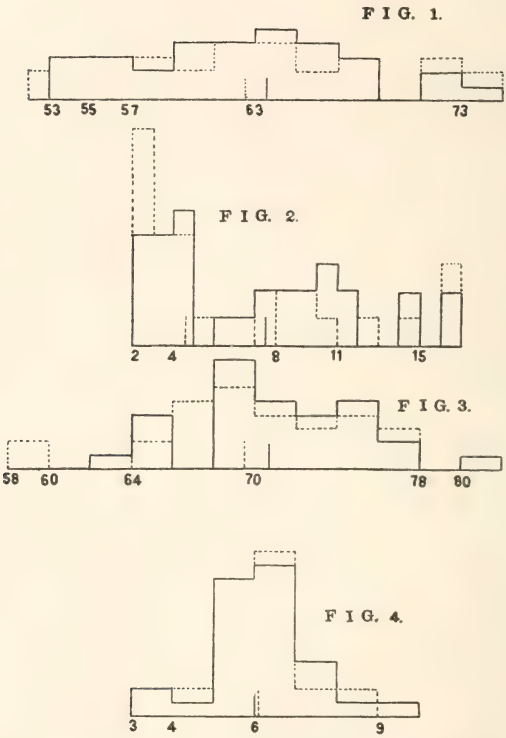
lower limit fifteen cases (25 % = 14½), which brings us to the group of three cities which spend 58 % of their money for teaching; in like manner, counting from the other extreme, 25 % of the cases are found to spend more than 67 % of their money for teaching. The limits within which the middle 50 % of the cases lie are, then, 58 and 67, and 2 Q equals (67 — 58 = 9) nine. After we have found the 2 Q, the relation which it bears to the median gives us a still better idea of the variability of the group. If it is desired to compare the variability of the group in several traits, the relation of the 2 Q to the square root of the median is more exact than either of the figures before suggested because this measure will be less affected by errors due to inaccuracy of measurements, or to the small number of measurements made. In the table below, 2 Q, the per cent. which 2 Q is of the median, and the per cent. which 2 Q is of the square root of the median are given. This table is derived from the frequency tables, Tables X to XXVII inclusive.

	2 Q.	Per cent. which 2 Q is of the median.	Per cent. which 2 Q is of the square foot of the median.
Per cent. of total spent for each item. First year's figures. See Tables X to XIII inclusive:			
Teaching	9	14	113
Supervision	8	105	290
Janitors' Salaries	1	16	40
Fuel	3	50	123
Per cent. of total spent for each item. Average of two years' figures. See Tables XIV to XVII inclusive:			
Teaching	9	14	112
Supervision	8	100	283
Janitors' Salaries	4	65	166
Fuel	1	16	42
Cost per pupil. First year's figures. See Tables XVIII to XXII inclusive:			
Total cost per pupil	7	25	132
Teaching and Supervision	6	33	136
Janitors' Salaries	.7	37	50
Fuel	.8	50	61
Text-Books and Supplies	.9	53	69

	2 Q.	Per cent. which 2 Q is of the median.	Per cent. which 2 Q is of the square root of the median.
Cost per pupil. Average of two years' figures. See Tables XXIII to XXVII inclusive:			
Total cost per pupil	5	17	93
Teaching and Supervision	5	25	111
Janitors' Salaries	.7	37	50
Fuel	.7	41	53
Text-Books and Supplies	.8	50	61

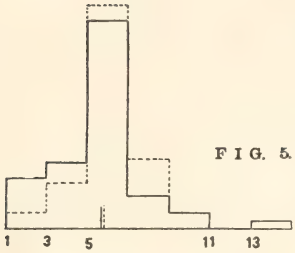
In the diagrams which follow, the variability is expressed graphically. The heavy line gives the distribution based on the average of the first and second years' figures, while the dotted line gives the distribution for the first year's figures from those cities which reported both years. Along the horizontal axis is indicated the per cent. of the total (or cost per pupil), while the vertical distance indicates the number of cases.

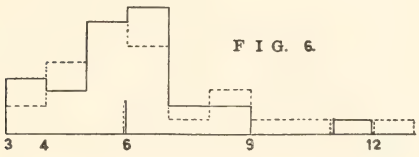
This method of indicating variability enables one who is accustomed to this mode of representation to take in at a glance at least the more striking features. It will be noticed that in the main the distribution for the first year's figures, taken alone (the dotted line), conforms to that for the average of the two years. This is significant in that it shows that the conclusions which may be drawn from the one year's figures are fairly reliable, and that we were justified in our treatment of variability above to make use of the first year's figures with the greater number of cases.

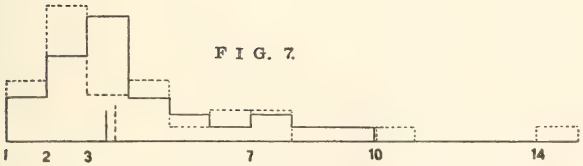


SURFACES OF FREQUENCY ON THE PER CENT. OF TOTAL BASIS.

Fig. 1.—Teaching.
Fig. 2.—Supervision.
Fig. 3.—Teaching and Supervision.
Fig. 4.—Janitors' Salaries.

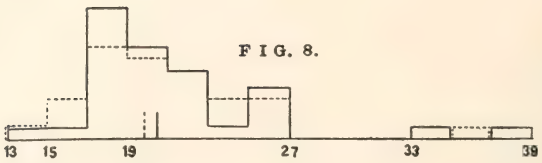


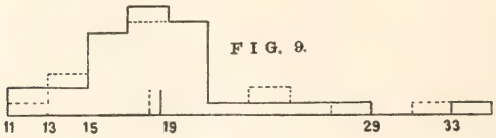


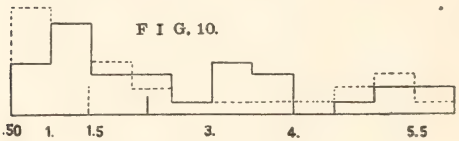


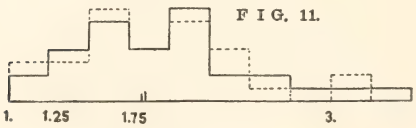
SURFACES OF FREQUENCY ON THE PER CENT. OF TOTAL BASIS

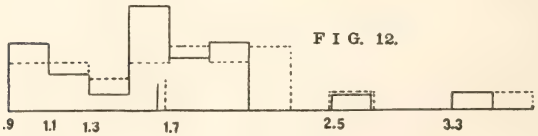
Fig. 5.—Text-Books and Supplies.
Fig. 6.—Fuel.
Fig. 7.—Repairs.





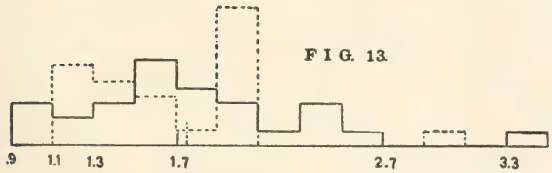


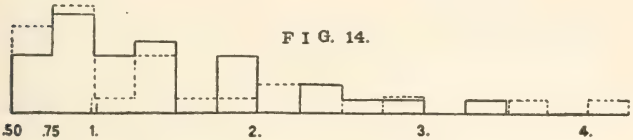




SURFACES OF FREQUENCY ON THE COST PER PUPIL BASIS

Fig. 8.—Teaching and Supervision.
Fig. 9.—Teaching.
Fig. 10.—Supervision.
Fig. 11.—Janitors' Salaries.
Fig. 12.—Text-Books and Supplies.





SURFACES OF FREQUENCY ON THE COST PER PUPIL BASIS

Fig. 13.—Fuel.
Fig. 14.—Repairs.

Still another method of indicating variability is by means of giving the deviation for each of the items from some central figure which may be agreed upon.

In the tables which follow, the deviations are calculated from the median. The median, which is simply the point above and below which fifty per cent. of the cases lie, is, we believe, the best figure to use in this case as representing a central tendency. It is unambiguous and is not so much influenced by extreme cases nor by error as the average would be.

EXPLANATION OF TABLES

Table XXVIII gives the medians and deviations from them for the cost per pupil based on the average number of pupils in daily attendance. The data are from fifty-seven cities reporting for the school year 1902–1903 (see Table VII). The first line of the table gives the medians. One half of the cities spend less than $28.50 or just $28.50 per pupil, while the other half spend more than $28.50 or just that amount per pupil for maintenance and operation of their schools. In like manner, $19.96 marks the point above and below which half of the cities lie in their expenditure for teaching and supervision; $18.10 is the median for teaching alone; $1.75 is the median for supervision, and so on for the other items given. In the body of the table, deviations below the median are marked with a minus sign, those above are not marked.

Line number nine reads as follows: City number eight spends $2.66 per pupil more than the median ($28.50) for the maintenance and operation of schools; $2.37 per pupil more than the median ($19.96) for teaching and supervision; the median amount, $18.10 per pupil, for teaching; $2.48 per pupil more than the median for supervision, etc.

Table XXIX gives the medians and deviations from them for the per cent. which each item is of the total cost of maintenance and operation. The data from which this table is derived are found in Table III, which gives information for fifty-eight cities for the school year 1902–1903. The first line of the table gives the medians for the several items of expenditure expressed as per cents and hundredths of a per cent. As in Table XXVIII, the deviations below the median are marked with a minus sign while those above are left unmarked. Line two reads as follows: City number one spent 5.5 % less than the median (71.15 %) for teaching and supervision; *i. e.*, 65.65 % of the total cost of maintenance and operation was spent for teaching and supervision. If we skip the next two items, we find that this city spent .42 % more than the median (6.19 %) for janitors' salaries; 2.24 % more than the median (2.91 %) for text-books, etc.

Table XXX gives medians and deviations on cost per pupil basis for thirty cities, reporting for the school year 1903–1904. The figures refer to dollars and tenths of a dollar. This table is derived from Table VIII. The explanation given for Table XXVIII makes this table clear, since this table differs from Table XXVIII only in that it is based on the second year's data and in that it gives the deviations for fewer items.

Table XXXI gives medians and deviations for per cent. which each item is of the total cost of maintenance and operation. The data are from thirty cities for the school year 1903–1904 (see Table IV). The figures refer to per cents and tenths of one per cent. The explanation for Table XXIX, which gives the same information for the school year 1902–1903, may be referred to by any one who has difficulty in understanding this table.

Tables XXXII and XXXIII give medians and deviations from medians on both cost per pupil and per cent. of total basis, which are based on two years' figures. These tables are made up by taking the average of the cost per pupil, or the per cent. of total of each item for two years. From these tables, giving the average for each item for two years, medians are calculated and deviations found as in the tables based on a single year's figures. These tables are read precisely as Tables XXX and XXXI.

From these tables we can get again the distribution of the cases by grouping those which vary by the same amount. If

this were done we would get frequency tables similar to those given above, or if we represented the distribution graphically, surfaces of distribution like those already given.

By examining these tables carefully, it will be seen that certain variations in one item are accompanied by like variations in some other item, or that a plus deviation in one item is accompanied by a negative deviation for the other, or *vice versa*. Take, for example, the items of janitors' salaries and salaries for teaching and supervision, as given in Table XXIX (per cent. of total first year's figures). In these items one is struck by the fact that a plus deviation in salaries paid janitors is often accompanied by a negative deviation for teaching and supervision, and *vice versa*. Picking out the cases, a table like the following may be made:

No. of City.	Janitors' Salaries.	Salaries for Teaching and Supervision.
1.	+4.	−5.5
7.	+3.3	−3.4
9.	+1.3	−1.5
11.	+3.	−9.9
14.	+ .7	−3.6
17.	+ .8	− .5
19.	+ .6	−5.9
23.	+8.7	−13.0
27.	+1.1	−4.5
28.	+1.0	−2.0
29.	+ .8	−6.6
30.	+ .1	− .1
31.	+ .4	−11.8
34.	+1.9	−2.4
43.	+1.5	−2.4
47.	+2.3	−26.9
52.	+ .8	−12.2
56.	+2.2	− .2
6	− .9	+5.9
8.	− .1	+ .5
10.	− .3	+4.3
20.	−1.0	+2.4
21.	− .3	+10.5
22.	−2.0	+3.9
25.	−1.3	+6.7
26.	− .3	+1.8
33.	− .1	+11.1
36.	−2.7	+5.2
37.	− .8	+4.9
38.	−2.4	+2.8
39.	−1.0	+2.2
46.	−1.6	+1.4
49.	−2.2	+4.8
51.	− .7	+8.4
57.	−1.5	+3.4
58.	− .8	+1.6

TABLE XXVIII

Medians and deviations from medians for cost per pupil based on the average number of pupils in daily attendance, expressed as dollars and cents. Fifty-eight cities, for the school year 1902–03.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books.	Supplies.
Medians.	28.50	19.96	18.10	1.75	1.87	.82	.64
1.	7.14	3.37	4.20	— .72	.48	1.01	.54
2.	— .50	— 1.43	— .50	— .82		.42	— .33
3.	— .44	.26	1.00	— .63	.11		
4.	3.40	3.83	2.25	1.69	.40	.26	.28
5.	4.77	5.19	6.31	— 1.01	.32		
6.	— .85	1.29	2.00	— .60	— .42		
7.	— 6.89	— 5.34	— 5.19	— .04	.18	— .28	.17
8.	2.66	2.37	0	2.48	.02	.73	.18
9.	2.51	1.53	2.53	— .89	.45		
10.	14.73	2.68	13.81	— 1.02	.69	.17	.75
11.	.51	— 2.19	— 3.68	1.60	.78		
12.	.70	1.45	.65	.91	.34	.03	
13.	1.06	1.08	— 2.20	3.39	.16	— .05	.19
14.	.25	— .63	— .21	— .31	.08	.07	.07
15.	— 3.15	— 1.50	— .19	— 1.20	— .34	.19	.37
16.	— .09	1.43	1.07	.47	— .05	0	.30
17.	7.50	5.46	4.50	1.07	.66	.23	.47
18.	7.20	6.18	7.07	— .15	.56		
19.	.40	— .82	.06	— .77	.10	.55	.18
20.	— 5.34	— 2.89	— 1.52	— 1.26	— .68	— .27	— .28
21.	— 4.00	.02	— 1.20	1.33	— .43		— .26
22.	— 19.56	— 13.22	— 11.47	— 1.64	— 1.40		— .11
23.	— 15.65	— 12.49	— 14.41	2.03	.05		
24.	— 13.24	— 8.68	— 8.23	— .34	— .91	— .72	— .42
25.	2.50	4.16	3.57	.75	— .34	— .71	— .53
26.	4.17	3.88	.27	3.72	.05	— .16	.35
27.	1.54	— 2.03	— 2.99	1.07	.08	.82	
28.	1.80	1.00	1.67	— .56	.32		

TABLE XXVIII (*Continued*)

Medians and deviations from medians for cost per pupil based on the average number of pupils in daily attendance, expressed as dollars and cents. Fifty-eight cities, for the school year 1902–03.

Number of City.	Text-Books and Supplies.	Fuel.	Repairs.	Furniture.	Apparatus.	Reference and Library Books.	Miscellaneous Expenses.
Medians.	1.68	1.63	1.09	.18	.18	.14	.63
1.	1.33	0	.79	.39	.29	— .11	— .47
2.	— .13	3.07	.41	— .03	— .11		
3.	.04	— .31	0	— .02			
4.	.32	— .10	— .03	— .06	.09		
5.	.31	.40	— .73	— .06	— .02	— .05	
6.	.13	— .49	0		.01		
7.	— .33	— .83	.34	— .11			
8.	.33	.19	.08	— .04	— .10	— .08	
9.		1.28	— 1.04				.79
10.	.70	.21	1.20				
11.		.14	.15	— .10			1.33
12.		.42	— .06				
13.	— .08	.32	— .32	— .03	— .12	— .12	— .26
14.	— .08		.93	.04	— .08	— .08	— .46
15.	.34	.08	— .40	— .15	— .11	— .12	
16.	.08	— .19	— .05				
17.	.48	1.01	.34	— .05	.07	— .06	— .55
18.		.67	— .11				
19.	.51	.45	.55	— .01	.17		
20.	— .77	.66	— .24				— .41
21.		— .69	— .15	.02		— .06	
22.		— 1.26	— .50				
23.		— .36	— .19	.02	— .10	.13	
24.	— 1.36	— .60	— .64				— .44
25.	— 1.46	.41	.74		— .13	— .02	
26.	— .03	— .18	.03		— .01	.92	
27.		— .38	— .46	.07	.26	.14	.55
28.	.46	.65		.06			.26

TABLE XXVIII (*Continued*)

Medians and deviations from medians for cost per pupil based on the average number of pupils in daily attendance, expressed as dollars and cents. Fifty-eight cities, for the school year 1902–03.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books.	Supplies.
Medians.	28.50	19.96	18.10	1.75	1.87	.82	.64
29.	1.00	— .89	.11	— .89	.19		
30.	8.82	6.30	7.15	— .74	.49	— .18	.40
31.	— .60	— 3.42	— 2.35	— .96	— .03		
32.	5.99	.40	.97	— .46	.06	— .45	0
33.	— 3.65	0	— 1.32	1.43	— .35		— .47
34.	7.46	4.75	5.05	— .19	1.05	— .80	— .31
35.	— 3.98	— 1.60	— .23	— 1.26	— .27	— .80	
36.	3.44	4.46	.78	3.79	— .76		— .43
37.	— 9.24	— 5.31	— 6.70	1.50	— .86		
38.	— 4.94	— 3.00	— 2.89	0	— .96	— .77	— .54
39.	3.51	3.53	1.84	1.80	— .20		— .08
40.	6.29	3.36	3.80	— .33	— .49	— .22	.81
41.	— 3.85	— 2.94	— 2.11	— .72	— .74		
42.	0	— .06	— 2.63	2.58	— .38	.61	.48
43.	— 2.41	— 2.04	— 1.10	— .83	— .14	— .33	— .19
44.	— 2.32	— 2.08	— 1.41	— .56	— .29	— .51	
45.	.03	— .18	1.04	— 1.11	— .34	.73	— .29
46.	13.02	10.28	7.43	2.96	.04	.37	.08
47.	— 7.79	— 10.81	— 12.32	1.62	— .12	— .13	
48.	— 5.75	— 4.44	— 4.81	.48	— .51	.15	— .33
49.	— 6.30	— 3.07	— 3.90	.94	— .98	.33	— .42
50.							
51.	3.55	5.54	2.95	2.70	— .11	— .23	— .49
52.	— 2.11	— 4.40	— 4.29	0	— .03	— .03	.28
53.	2.11	4.27	2.39	1.99	.24		
54.	26.22	6.51	12.50	4.12	1.18	1.29	1.86
55.	— 8.00	— 6.66	— 5.49	— 1.06	— .78		
56.	— .49	— .07	— 2.77	2.81	.48	— .37	— .12
57.	22.75	18.33	15.10	3.34	.55	.52	1.59
58.	— 6.99	— 4.33	— 4.55	.33	— .70		

TABLE XXVIII (*Continued*)

Medians and deviations from medians for cost per pupil based on the average number of pupils in daily attendance, expressed as dollars and cents. Fifty-eight cities, for the school year 1902–03.

Number of City.	Text-Books and Supplies.	Fuel.	Repairs.	Furniture.	Apparatus.	Reference and Library Books.	Miscellaneous Expenses.
Medians.	1.68	1.63	1.09	.18	.18	.14	.63
29.	.33	— .12			.17	.05	
30.	0	.22	1.66	.17	— .11	.29	
31.	— .12	1.86	.70	.18			.38
32.	— .67	.62	2.58	.69	.03	.52	.66
33.		— .39	.08				— .61
34.	— 1.33	1.98	— .57	.44	.05		— .46
35.		— .24	— .41	— .03	— .02	.08	.36
36.		.03	— .37	.24	.01	.14	.94
37.		— .48	— .64				0
38.	— 1.53	— .33	1.23	— .12	0	.16	— .32
39.			.27			1.23	
40.	.37		.12	.01			— .18
41.	— .28	— .14	— 1.05	— .02			.64
42.	.87		— .29	.15	— .02	— .03	
43.	— .74	.68	— .44	0	.04	— .04	.06
44.		.99	.03	— .02	0	— 03	
45.	.22	.55	.89	— .04	— .13	.01	.05
46.	.23	0	— .02	.41	.05	.12	— .59
47.		1.71	1.64	.25	— .14	0	
48.	— .40	— .24	— .75	— .09	— .13	— .07	.10
49.	— .31	— .41	— .80	.03	.02	— .02	— .57
50.							
51.	— .94	.16	— .50	— .14	.07	.12	
52.	.03		2.86		.08	— .08	— .16
53.			— .09	.25			
54.	2.93	1.09	1.21	.08	1.03	.07	.03
55.	.46	— .49	— .52	.12	.11	.10	1.38
56.	— .71	— .41	.41	0	— .12	— .02	— .38
57.	1.89	.38	1.14	.28	.04	.09	
58.	— .29	— .94	.03		— .15	.29	

TABLE XXIX

Medians and deviations from medians for the per cent. which each item is of the total cost of maintenance and operation. Fifty-eight cities, for the school year 1902–03. The figures refer to per cents and hundredths of per cents.

Number of City.	Teaching and Supervision.	Supervision.	Teaching.	Janitors' Salaries.	Text-Books.	Supplies.	Text-Books and Supplies.
Medians.	71.15	7.62	63.44	6.19	2.91	1.85	5.98
1.	−5.5	−4.73	−.82	.42	2.24	1.47	2.48
2.	−4.75	−4.31	−.33		1.55	−.76	−.44
3.	.99	−3.63	4.71	.88			.16
4.	2.22	3.07	.24	.92	.48	1.04	.29
5.	4.80	−5.38	10.27	.43			.06
6.	5.85	−3.47	9.41	−.93			.57
7.	−3.44	.31	−3.66	3.31	−.41	1.90	.26
8.	.54	5.97	−5.34	−.11	2.06	−.37	.46
9.	−1.49	−4.83	3.43	1.30			.76
10.	4.34	−5.93	10.36	−.28	−.60	1.37	−.46
11.	−9.89	3.93	−13.73	2.95			
12.	2.17	1.53	.76	1.39	.57		
13.	.05	9.73	−9.59	.69	−.30	.97	−.56
14.	−3.62	−2.58	−.95	.65	.23	.65	−.35
15.	2.25	−5.46	7.80	0	1.07	2.12	1.96
16.	4.16	.20	4.05	.22	0	1.47	.24
17.	−.52	.20	−.63	.84	.01	1.22	0
18.	3.74	−3.14	6.97	.60			
19.	−5.86	−3.22	−.55	.62	1.83	.99	1.59
20.	2.38	−5.49	8.04	−1.04	−.52	−.30	−3.05
21.	10.54	4.97	5.66	−.31		−.31	
22.	3.92	−6.44	10.45	−2.01		4.00	
23.	−12.96	21.79	−34.66	8.73			
24.	2.81	1.61	1.29	.08	−2.23	−.43	−4.77
25.	6.67	.28	6.58	−1.25	−2.57	−1.52	−5.32
26.	1.82	9.11	−7.20	−.32	−.88	1.20	−.90
27.	−4.54	2.80	−6.25	1.07	3.19	.07	1.89
28.	−2.03	−3.71	1.77	1.04			−2.21
29.	−6.64	−4.71	−1.84	.80			.84

TABLE XXIX (*Continued*)

Medians and deviations from medians for the per cent. which each item is of the total cost of maintenance and operation. Fifty-eight cities, for the school year 1902–03. The figures refer to per cents and hundredths of per cents.

Number of City.	Fuel.	Repairs.	Furniture	Apparatus.	Reference and Library Books.	Miscellaneous Expenses.
Medians.	5.91	3.92	.6	.6	.49	1.64
1.	—1.35	1.35	—.20	.86	—.44	0
2.	10.89	1.45	—.10	—.35		
3.	—1.20	—.04	—.08			
4.	—1.13	—.61	—.25	.24		
5.	.20	—2.93	—.27	—.10	—.24	
6.	—1.80	.03		.09		
7.	—2.20	2.71	—.30			
8.	—.08	—.15	—.17	—.35	—.32	
9.	3.49	—3.79				2.95
10.	—1.65	1.38				
11.	.19	.35	—.36			5.11
12.	1.89	—.41				
13.	.68	—1.32	—.13	—.39	—.44	—.85
14.	—2.33	3.16	.15	—.25	—.31	—1.04
15.	.82	—1.18	—.52	—.32	—.44	
16.	—.85	.10				
17.	1.43	.07	—.27	.09	—.29	—1.42
18.	.51	—1.17	—.03			
19.	1.27	1.76		.63		
20.	3.95	—.25				—.71
21.	—2.08	—.09	.17		—.20	
22.	—1.81	2.68				
23.	4.00	3.11	.88		1.56	
24.	.80	—.99				—.37
25.	.67	3.00		—.43	—.16	
26.	—1.47	—.50		—.07	2.74	
27.	—1.24	—1.57	.31	1.05	.52	2.76
28.	1.64		.16			1.29
29.	—.82			.59	.13	

TABLE XXIX (*Continued*)

Medians and deviations from medians for the per cent. which each item is of the total cost of maintenance and operation. Fifty-eight cities, for the school year 1902–03. The figures refer to per cents and hundredths of per cents.

Number of City.	Teaching and Supervision.	Supervision.	Teaching.	Janitors' Salaries.	Text-Books.	Supplies.	Text-Books and Supplies.
Medians.	71.15	7.62	63.44	6.19	2.91	1.85	5.98
30.	— .05	— 4.91	4.95	.13	— 1.19	.93	— 1.49
31.	— 11.76	— 4.78	— 6.99	.40			— .37
32.	— 12.12	— 3.88	— 8.15	— .59	— 1.84	.02	— 3.05
33.	11.17	5.18	4.08	— .05		— 1.16	
34.	— 2.37	— 3.19	1.01	1.94	— 2.85	— .93	— 5.01
35.	4.05	— 5.60	9.74	.36	— 2.82		
36.	5.20	9.65	— 4.46	— 2.73		— 1.20	
37.	4.92	9.27	— 4.26	— .83			
38.	2.80	— .21	1.10	— 2.35	— 2.69	— 1.43	— 5.35
39.	2.19	3.47	— 1.19	— .99		— .10	
40.	— 3.92	— 3.58	— .25	— 2.25	— 1.17	2.29	— .11
41.	— 2.07	— 4.42	1.44	— 1.60			— .30
42.	— 1.46	6.86	— 9.23	— .96	2.13	2.06	2.96
43.	— 2.37	— 3.99	1.81	1.46	— 1.03	— .16	— 2.42
44.	— 2.85	— 2.97	.31	— .14	— 1.72		
45.	— 1.81	— 5.36	3.64	— .85	2.54	— .64	.67
46.	1.41	3.68	— 2.18	— 1.63	— .05	— .13	— 1.41
47.	— 26.94	8.69	— 35.54	2.25	.44		
48.	— 4.97	2.16	— 5.04	— .21	1.38	— .49	— .34
49.	4.83	4.48	.44	— 2.16	2.28	— .84	.21
50.	— 1.30	— .66	— .55	— 2.80	1.60	— .26	.11
51.	8.39	6.26	2.22	— .72	— 1.04	— 1.38	— 3.65
52.	— 12.21	— 1.02	— 11.10	.81	.08	1.63	.48
53.	7.52	4.17	3.44	.70			
54.	— 4.42	3.12	— 7.45	— .53	.94	2.72	2.43
55.	— 6.30	— 4.17	— 1.94	— .88	2.69		
56.	— .24	8.67	— 8.82	2.18	— 1.30	0	— 2.53
57.	3.42	2.30	1.21	— 1.47	— .29	2.50	.98
58.	1.60	2.03	— .34	— .78			.50

TABLE XXIX (*Continued*)

Medians and deviations from medians for the per cent. which each item is of the total cost of maintenance and operation. Fifty-eight cities, for the school year 1902–03. The figures refer to per cents and hundredths of per cents.

Number of City.	Fuel.	Repairs.	Furniture.	Apparatus.	Reference and Library Books.	Miscellaneous Expenses.
Medians.	5.91	3.92	.6	.06	.49	1.64
30.	— .97	3.43	.32	— .42	.65	
31.	6.59	2.49	.66			1.98
32.	.62	6.69	1.89	.02		2.11
33.	— .92	.79				— 1.57
34.	4.09	— 2.46	1.09	.05		— 1.16
35.	— .22	— 1.12	— .04	.07	.38	.24
36.	— .74	— 1.65	.68	— .01	.35	3.25
37.	.08	— 1.58				1.62
38.		5.90	— .39	.18	.74	— .33
39.		.32			3.85	
40.	2.81	— .45	— .09			— .36
41.	.16	— 3.74	0			.35
42.	— .32	— 1.12	.52	— .04	— .14	
43.	2.95	— 1.42	.07	.25	.16	1.17
44.	4.09	.38	— .02	.09	— .09	
45.	— 3.13	3.02	— .16	— .43	.01	0
46.	— 2.00	— 1.34	.79	— .05	.11	— 1.54
47.	10.18	9.28	1.44	— .43	.13	
48.	.25	— 2.43	— .23	— .38	— .22	1.57
49.	— .45	— 2.59	.30	.30	0	— 1.36
50.	.35	2.97	1.51			
51.	— .33	— 2.06	— .48	.18	.29	
52.		11.03		.39	— .31	.15
53.		— .59	.78			
54.	— .94	.29	— .14	1.62	.12	— .44
55.	— .32	— 1.12	.80	.80	— .63	
56.	— 1.54	1.42	0	— .40	— .09	— .76
57.	— 1.99	.43	.27	— .17	— .06	
58.	— 1.67	1.26		— .47	1.45	

TABLE XXX

Medians and deviations from medians for cost per pupil based on the average number of pupils in daily attendance, expressed as dollars and cents. Thirty cities, for the school year 1903–04. The figures refer to dollars and tenths of dollars.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	29.08	21.19	18.90	1.74	1.91	1.61	1.67	1.12
5.	5.0	4.3	5.9	−1.0	.4	−.3	1.1	−.7
6.	−4.8	−5.4	−4.2	−.6	−.3	0	.2	1.1
8.	3.3	2.5	3.7	2.5	0	.2	.1	0
13.	5.1	4.3	2.0	3.4	0	.2	.6	−.3
14.	−.3	−1.2	−.3	−.4	.4	0		.2
15.	−4.4	−2.5	−4.2	2.1	−.4	−.2	−.2	−.4
16.	−.9	.1	.3	.4	0	−.1	.3	−.3
20.	−6.0	−3.8	−2.2	−1.1	−.6	.4	.3	−.6
27.	−2.8	−3.0	−4.3	1.9	.1	0	−1.1	−.1
28.	.3	−.6	.6	−.6	.2	−.7		
29.	−4.4	−5.6	−1.1	−1.0	.2	.4	−.2	.1
30.	9.6	5.8	7.1	−.8	.5		0	2.4
31.	1.8	0	1.5	−.9	.1		.4	1.7
32.	−1.1	−1.1	−3.4	2.9	.1	−.8	0	−.1
34.	2.5	.4	1.3	−.4	2.5		−.5	.5
35.	.8	2.2	2.8	−.1	−.5	−1.5	.3	.3
36.	2.6	5.3	2.3	3.6	−.7		.4	−1.2
37.	−8.4	−5.4	−6.7	1.9	−.8		0	−.2
39.	−.3	.3	−1.1	1.9	−.3			0
40.	2.1	.2	−3.2	3.9	−.8	.4		.1
41.	−3.7	−3.2	−4.5	1.8	−.8	−.2	.2	−.2
42.	0	−.9	−3.2	2.9	−.4	1.1	−.3	−.1
43.	1.4	1.7	3.2	−.8	0	−.7	−.7	−.2
45.	0	0	.5	.1	−.2	0	−.5	.4
48.	−1.4	−1.5	−3.2	2.3	−.4	.4	−.3	−.1
52.	−.1	−2.1	−1.5	−.1	.4	.5	−.6	.3
54.	19.1	9.8	6.3	4.0	.7	7.1		.2
55.	−11.2	−8.0	−6.8	−.6	−.9	−.5	−.8	−.7
56.	1.9	1.0	2.0	−.4	.7	−.3	−.3	0
57.	23.4	17.9	15.2	.33	1.0	1.6	.4	1.1

TABLE XXXI

Medians and deviations from medians for the per cent. which each item is of the total cost of maintenance and operation. Thirty cities, for the year 1903–04. The figures refer to per cents and tenths of per cents.

Number of City.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	71.7	64.2	6.3	6.1	5.5	5.8	3.8
5.	3.2	8.5	−4.1	6	−1.7	2.3	−2.8
6.	−6.5	−3.7	−1.6	.5	1.2	2.0	5.2
8.	1.6	5.8	−3.0	−.4	.1	−.3	−.3
13.	2.8	−3.3	7.1	−.5	−.2	.8	−1.4
14.	−2.4	.2	−1.4	1.8	.1		.9
15.	4.4	−3.7	9.3	.3	0	0	−1.0
16.	4.2	4.1	1.1	.6	−.5	1.3	−.9
20.	4.0	8.8	−3.3	−.6	−.1	1.6	−1.4
27.	−1.9	−8.6	7.7	1.8	.7	−3.6	1.1
28.	−1.4	2.2	−2.5	1.0	−2.5		0
29.	−4.7	−.3	−3.2	2.3		.3	1.3
30.	−1.7	3.1	−3.7	.2		−1.5	5.5
31.	−3.1	1.7	−3.7	.5		4.3	5.3
32.	0	−8.9	10.1	1.2	−2.7	.2	−.2
34.	−3.1	−.1	−1.9	4.6		−2.2	1.3
35.	6.6	8.4	−.8	−1.3	−5.0	.5	1.1
36.	13.7	4.0	10.8	−2.4		.7	−3.7
37.	4.7	−5.4	11.3	−.8		2.1	.8
39.	2.9	−2.2	6.4	−.6			.2
40.	−2.6	−13.3	11.9	−2.4	1.0		0
41.	−.7	−7.4	7.8	−1.6	0	1.6	−.2
42.	−1.7	−10.1	9.7	−.9	3.7	−1.0	−.4
43.	3.6	8.0	−3.2	.2	−2.5	−2.7	−.9
45.	1.5	2.6	0	−.4	0	−1.7	1.3
48.	−.7	−7.7	8.1	−.7	1.5	−.7	.1
52.	−5.7	−4.0	−.7	1.8	2.7	−2.0	.9
54.	−5.5	−12.1	5.7	−.8	12.5	0	−1.0
55.	1.9	3.1	0	−.2	.5	−.8	−2.5
56	0	3.0	−1.9	2.2	−1.3	−1.4	−.2
57	2.9	.7	3.3	−.5		−1.8	.4

TABLE XXXII

Medians and deviations from medians for average cost per pupil for two years based on the average number of pupils in daily attendance. The figures refer to dollars and tenths of dollars. Thirty cities, reporting for two school years, 1902–03 and 1903–04.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs
Medians.	28.8	20.5	18.3	2.2	1.9	1.6	1.7	1.1
5.	5.9	4.9	6.3	−1.4	.4	0	.7	−.7
6.	−2.8	−1.9	−.9	−1.0	−.3	.1	−.2	.6
8.	3.0	2.5	2.0	.5	0	.3	.1	.1
13.	3.1	2.8	.1	2.7	.1	.1	.4	−.3
14.	0	−.8	−.1	−.8	.2	0	.8	.6
15.	−3.3	−1.9	−1.9	0	−.3	0	−.1	−.4
16.	−.4	.9	.9	0	0	0	0	−.1
20.	−5.7	−3.2	−1.7	−1.6	−.6	−.6	.4	−.4
27.	−2.7	−2.4	−3.5	1.1	.1	0	−.8	−.2
28.	1.0	.3	1.3	−1.0	.3	−.6		
29.	−1.7	−2.7	−1.3	−1.4	.2	.3	−.2	.2
30.	9.2	6.2	7.3	−1.2	.5		0	2.1
31.	.6	1.6	−.2	−1.4	.1		1.6	1.2
32.	2.4	−.2	−1.0	.8	.1	−.7	.3	1.3
34.	4.9	4.7	3.4	−.7	1.3		.7	0
35.	−1.6	.4	1.5	−1.1	−.3		−.1	0
36.	3.0	5.0	1.7	3.2	−.7		.1	−.7
37.	−8.8	−5.3	−6.5	1.3	−.8		−.3	−.4
39.	1.6	2.0	.6	1.4	−.2		.3	.2
40.	4.2	1.9	.5	1.3	−.6	.4	.8	.1
41.	−3.8	−3.0	−3.1	.1	−.7	−.2	0	−.6
42.	0	−3.4	−2.7	2.3	−.4	1.0	−.2	−.2
43.	−.5	0	1.2	−1.2	0	−.7	0	−.3
45.	0	0	1.0	−.9	−.3	.1	−.5	.6
48.	−3.5	−2.9	−3.8	.9	−.4	0	−.2	−.4
52.	−1.1	−3.1	−2.7	−.5	.2	.3	−.6	1.6
54.	22.7	13.3	9.6	3.6	1.0	4.5	.6	−.8
55.	−7.6	−7.2	−6.0	−1.3	−.8	−.5	−.7	−.7
56.	.7	.6	−.2	.8	.6	−.5	−.3	.2
57.	23.1	18.2	15.3	2.9	.8	1.7	.3	1.1

TABLE XXXIII

Medians and deviations from medians for per cent. of total which each item is, based on average for two years. Thirty cities, reporting for the school years 1902–03 and 1903–04. The figures refer to per cents and tenths of per cents.

Number of City.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	70.7	63.1	8.0	6.1	5.7	5.9	3.5
5.	4.7	10.1	−5.8	.6	−.5	1.2	−2.6
6.	.3	3.6	−3.6	−.1	.9	.1	3.0
8.	1.8	.9	.4	−.1	.3	−.2	.1
13.	2.1	−3.7	7.4	.2	−.4	.7	−1.0
14.	−2.3	.3	−3.1	1.3	−.1	2.2	2.4
15.	4.0	2.7	.9	.2	1.0	.3	−.7
16.	4.8	4.8	−.4	.5	−.1	.2	0
20.	3.9	9.1	−5.4	−.8	−1.3	2.7	−.5
27.	−2.6	−7.2	4.6	1.5	1.3	−2.4	.1
28.	−1.0	2.7	−4.1	1.0	−2.3		
29.	−5.0	−.3	−5.0	1.6	1.2	−.3	−1.4
30.	−.2	4.7	−5.4	.2		−1.3	4.8
31.	−6.7	−1.9	−5.3	.5		5.3	4.3
32.	−5.3	−8.8	2.1	.3	−2.9	.4	3.6
34.	−2.1	1.1	−3.6	3.3		.7	−.2
35.	6.0	9.8	−4.2	−.4	−5.4	0	.3
36.	10.1	−.5	9.2	−2.5	−5.0	−.1	−2.3
37.	5.5	−3.9	9.2	−.9		1.0	−.1
39.	3.2	−1.0	3.9	−.7		.6	.6
40.	−2.6	−6.1	3.1	−2.3	.4	1.4	.1
41.	−.7	−2.2	1.1	−1.6	−.1	.8	−1.7
42.	−.9	−9.0	7.7	−.9	3.4	−.8	−.4
43.	1.3	5.6	−4.7	.3	−2.4	0	−.8
45.	.5	3.8	−3.7	−.6	.4	−2.0	2.4
48.	−2.2	−5.7	4.1	−.4	.6	−.3	−.8
52.	−8.3	−6.9	−1.9	.3	1.6	−2.3	6.3
54.	−5.3	−9.1	3.3	−.7	7.5	−1.1	0
55.	−1.5	1.3	−3.2	−.5	.1	−.8	−1.5
56.	.5	−2.2	2.3	2.2	−1.9	−1.5	.9
57.	3.8	1.7	1.7	−1.0		−2.0	.7

There are thirty-six cases in which a positive deviation for one item is accompanied by a negative deviation for the other, and only twenty-one cases where like deviations occur for both items. One might seem justified in declaring that a negative relationship exists. It is not possible from the table to tell how large this negative relationship is, much less to express it in a single significant figure. It is just here that the great value of the Pearson Coefficient of Correlation [1] comes in.

In the next set of tables (see Tables XXXIV and XXXV) the deviations are given as a per cent. of the median. The gross deviations from the median are significant, especially when deviations for different items are compared with each other as indicated above, but the range of variability is better indicated, I believe, by giving the per cent. of the median or other single figure indicating a central tendency. For example, the median for janitors' salaries (first years' figures, per cent. basis) is 6.2 %, and for salaries for teaching and supervision it is 71.2 %. Now, a deviation of .6 % in the case of janitors' salaries seems insignificant when compared with a deviation of 7.1 % for teaching and supervision—the one is almost twelve times the other; but when we remember that each one represents a deviation equivalent to about 10 % of the median, we are nearer recognizing their real significance, I believe, than when we consider them merely in gross. Even this method of comparison is, however, misleading, since it is absolutely impossible for the items "teaching and supervision" or "teaching" to vary as much as 100 % above or below the median when the per cent. of the total is taken as the basis of comparison, because the median for teaching and supervision amounts to 70.7 %, and for teaching to 63.1 % of the total. On the cost per pupil basis, while it is not impossible to have a variation equal to 100 % of the median, or greater, for these larger items, yet, even if such variations occur, they are not comparable to variations which give the same per cent. of the median where this item represents a very much smaller part of the total expenditure.[2] Even after

[1] The reader not versed in statistical methods is referred to Thorndike's *Mental and Social Measurements* (The Science Press, 1904), where he will find a most satisfactory treatment of this and other statistical methods.

[2] For discussion of this point, see Thorndike, *Mental and Social Measurements*, pp. 102 and 103.

these qualifications (which show us that we must be on our guard in comparing variabilities for different items) have been made, I am still of the opinion that these tables are very helpful in giving us a correct idea of the variability of all items, as well as permitting us to compare the variability of items whose medians represent about the same proportion of the total or nearly the same cost per pupil.

In Table XXXIV the items which apparently show the least variability are "total," "teaching and supervision," and "teaching." As noted above, any deviation above the median is possible; *i. e.*, the deviation above the median may be 100 % or more of the median. It is striking to note that the deviations expressed as per cents of the median for the total amount spent range from — 30.6 % to + 80.2 %; while for teaching and supervision the range is from — 35.1 % to + 88.8 %. Apparently the amount paid per child for teaching and supervision is even more variable than the total amount of money spent per child. Possibly this is what we might have expected when we remember that teachers of some sort can be had for almost any salary, while some of the other commodities or utilities which must be had to run the school have a much more definite market value. The great range for supervision from — 73.7 % to + 166 % is at least partially to be accounted for, I believe, by the fact that no very clear distinction exists between teachers and supervisors or principals in some systems. Those who should have been reported as teachers are, doubtless, in some instances reported as supervisors, and *vice versa*.

The items "janitors' salaries," "text-books and supplies," and "fuel" furnish the best opportunity for comparison of variability. The medians for these items are respectively $1.90, $1.60, and $1.70. The range of deviations for janitors' salaries is from — 42.8 % to + 53.5 % of the median; for text-books and supplies, from — 42.7 % to + 274 %; and for fuel, from — 40.9 % to 93.6 %. That the smallest proportional plus variation should be found in the item of janitors' salaries, and the largest for the item of text-books and supplies seems to me to indicate that, in some cities at least, more money means more of those things which make possible efficient work in the schools.

The deviations for the item of repairs show a range of from — 74.8 % to + 196.6 % of the median. There would probably

TABLE XXXIV

Deviations from the medians; average cost per pupil for two years (see Table XXXII), reduced to per cents of the medians. The figures refer to per cents and tenths of per cents.

Number of City.	Total.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	28.8	20.5	18.3	2.2	1.9	1.6	1.7	1.1
5.	20.5	23.9	34.4	−64.5	21.4	0	40.9	−65.5
6.	−9.7	−9.3	−4.9	−46.1	−16.1	6.1	−11.7	56.1
8.	10.4	12.2	10.9	23.1	0	18.3	5.8	9.4
13.	10.8	13.7	.6	124.0	5.4	6.1	23.4	−28.1
14.	0	−3.9	−.6	−36.9	10.7	0	46.8	56.1
15.	−11.5	−9.3	−10.4	0	−16.1	0	−5.8	−37.4
16.	−1.4	4.4	4.9	0	0	0	0	−9.4
20.	−19.8	−15.6	−9.3	−73.7	−32.1	−36.6	23.4	−37.4
27.	−9.4	−11.7	−19.1	50.7	5.4	0	−46.8	−18.7
28.	3.5	1.5	7.1	−46.1	16.1	−36.6		
29.	−5.9	−13.2	−7.1	−64.5	10.7	18.3	−11.7	18.7
30.	32.0	30.2	39.9	−55.3	26.7		0	196.6
31.	2.1	7.8	−1.1	−64.5	5.4		93.6	112.2
32.	8.3	−1.0	−5.5	36.9	5.4	−42.7	17.6	121.6
34.	17.0	22.9	18.6	−32.3	69.5		40.9	0
35.	−5.6	1.9	8.2	−50.7	−16.1		−5.8	0
36.	10.4	24.4	9.3	148.0	−37.4		5.8	−65.5
37.	−30.6	−25.9	−35.5	59.9	−42.8		−17.6	−37.4
39.	5.6	9.8	3.3	64.5	−10.7		17.6	18.7
40.	14.6	9.3	2.7	59.9	−32.1	24.4	46.8	9.4
41.	−13.2	−14.6	−17.0	4.6	−37.4	−12.2	0	−56.1
42.	0	−16.6	−14.8	106.0	−21.4	61.0	−11.7	−18.7
43.	−1.7	0	6.6	−55.3	0	−42.7	0	−28.1
45.	0	0	5.5	−41.5	−16.1	6.1	−29.2	56.1
48.	−12.2	−14.1	−20.8	41.5	−21.4	0	−11.7	−37.4
52.	−3.8	−15.2	−14.8	23.1	10.7	18.3	−35.1	149.0
54.	78.8	64.9	52.5	166.0	53.5	274.3	35.1	−74.8
55.	−26.4	−35.1	−33.3	−59.9	−42.8	−30.5	−40.9	−65.5
56.	2.4	2.9	1.1	36.9	32.1	−30.5	−17.6	18.7
57.	80.2	88.8	83.6	134.0	42.8	104.0	17.6	102.8

TABLE XXXV

Deviations from the medians; average for two years of per cent. of total which each item is (see Table XXXIII), reduced to per cents of the medians. The figures refer to per cents and tenths of per cents.

Number of City.	Teaching and Supervision.	Teaching.	Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Medians.	70.7	63.1	8.0	6.1	5.7	5.9	3.5
5.	6.6	16.1	−72.5	9.8	−8.8	20.3	−74.3
6.	.4	5.7	−45.0	−1.6	15.8	1.7	85.8
8.	2.5	1.4	5.0	−1.6	5.3	−3.4	2.9
13.	3.0	−5.9	92.5	3.3	−7.0	11.8	−28.6
14.	−3.2	.5	−38.8	21.4	−1.8	37.3	68.6
15.	5.7	4.3	11.2	3.3	17.6	5.1	−20.1
16.	6.8	7.6	−5.0	8.2	−1.8	3.4	0
20.	5.5	14.4	−67.7	−13.2	−22.8	45.8	−14.3
27.	−3.7	−11.4	57.7	24.6	22.8	−40.7	2.9
28.	−1.4	4.3	−51.2	16.4	−40.4		
29.	−7.1	−.5	−62.5	26.3	21.1	−5.1	−40.1
30.	−.3	7.4	−67.7	3.3		−22.0	137.2
31.	−9.5	−3.0	−66.2	8.2		89.8	122.7
32.	−6.5	−13.9	26.2	4.9	−50.9	6.8	102.8
34.	−3.0	1.7	−45.0	54.1		11.9	−5.7
35.	8.5	15.5	−52.5	−6.6	−94.8	0	8.6
36.	14.3	−.8	115.0	−41.0	−87.8	−1.7	−65.7
37.	7.8	−6.2	115.0	−14.8		17.0	−2.9
39.	4.5	−1.6	48.7	−11.5		10.2	17.2
40.	−3.7	−9.7	38.8	−37.7	7.0	23.7	2.9
41.	−.9	−3.5	13.7	−26.2	−1.8	13.6	−48.6
42.	−1.3	−14.3	96.2	−14.8	59.7	−13.6	−11.5
43.	1.8	8.9	−58.7	4.9	−42.2	0	−22.9
45.	.7	6.0	−46.2	−9.9	7.0	−33.9	68.6
48.	−3.1	−9.0	51.2	−6.6	10.6	−5.1	−22.9
52.	−11.7	−10.9	−23.7	4.9	28.1	−39.0	179.8
54.	−7.5	−14.4	41.2	−11.5	132.6	−18.8	0
55.	−2.1	2.1	−40.0	−8.2	1.8	−13.6	−42.9
56.	.7	−3.5	28.7	36.1	−33.3	−25.4	25.7
57.	5.4	2.7	21.2	−16.4		−33.9	20.1

be less variability in this item if we had the figures for a period of five or ten years, instead of only two years' figures.

Table XXXV, which gives the deviations from the medians on the per cent. basis (the average for two years, see Table XXXIII) reduced to per cent. of the median, offers another interesting view of the variability. When we ask how a city spends its money regardless of the amount of money which it has to spend, we are dealing with the problem which every administrator of schools must face. From a median of 70.7 % spent for teaching and supervision, we find that the variations range from — 11.7 % to + 14.3 % of that proportion, while the deviations for teaching alone amount to from — 14.4 % to + 16.1 %. In these, and in the other items given in this table, we find a smaller range than is found for the same items on the cost per pupil basis. This means, of course, that amount of money per pupil available for maintenance and operation of schools varies much more than does the proportional distribution of that money.

On the basis used in this table, as well as on the cost per pupil basis, we find that the range above the median is less for janitors' salaries than for fuel or text-books and supplies—that of the three, text-books and supplies show the greatest range. The range for janitors' salaries is from — 41 % to + 54.1 % of the median; for fuel, from — 40.7 % to + 89.8 %; for text-books and supplies, from — 94.8 % to + 131.6 %. In a later section, where the relationship of these items to the total is worked out exactly, the item of text-books and supplies is shown to be more closely correlated with the total amount spent than are either of the other items.

As a conclusion to the discussion of variability, it may not be out of place to suggest certain limits within which, in my judgment, the cost per pupil or per cent. of total amount spent for each item should lie. Allowing for some difference in the cost of living, it seems to me that the superintendent of schools in any city spending less than $30 per pupil for the maintenance and operation of schools, should investigate in order to find out whether the schools are getting their just proportion of the money spent by the city. This amount seems small when compared with the rates of tuition charged to day pupils in our best private schools, where the tuition even in the lower grades is

commonly $100 to $200 per year. It is difficult to place the upper limit for the total cost per pupil, except by saying that the expenditure should be increased to such an extent that the public schools shall be able to do as efficient work as our best private schools. When we compare the meagre provision which was made for public education fifty years ago with an expenditure of $54 per pupil reported by one of the cities with which this study deals, we are inclined to feel hopeful for the future. If the superintendent of schools, or other school officer, has seen to it that as much money as possible is provided for the public schools, his next problem is to apportion the money secured among the several items of the budget to the best possible advantage. From the data given above, it is my judgment that an ideal budget would give to each of the principal items not less than the first proportion mentioned in the table below, nor more than that indicated by the last figure, except that cities spending an unusually large amount per pupil should, I believe, spend a relatively larger proportion for teaching and supervision, and for text-books and supplies; while the proportion spent for fuel, repairs, and janitors' salaries should increase much more slowly.

TABLE XXXVI

	% of Total.		% of Total.
Teaching and Supervision from	70 %	to	75 %
Supervision alone	" 7 %	"	10 %
Teaching alone	" 60 %	"	68 %
Janitors' Salaries	" 5 %	"	7 %
Text-Books and Supplies	" 4 %	"	6 %
Fuel	" 5 %	"	7 %
Repairs	" 3 %	"	5 %

Teaching and supervision are the most important factors in an effective school system and should, in my opinion, receive a greater rather than a smaller proportion than that usually given. The limits given for supervision are high rather than low, I think. There is a tendency to-day, I believe, to differentiate the work of the supervisor of instruction from that of the class teacher on the one hand, and, on the other, from the mere routine work of the assistant who keeps the office records. This means that a competent supervising principal can do the work of supervision formerly done by five or six men; and that even though he receives a larger salary than was paid any one of the five or six before, the proportion paid for supervision,

even when office clerks' salaries are included, has diminished. Janitors' salaries, fuel, and repairs are fixed charges upon the school revenue, which should not much increase in proportion to the amount per pupil available for school purposes.

The best way to decide just what is the best way to apportion the money among the various items of the budget would be to find out which school system is doing the best work, by testing the pupils in the system, and then to adopt as the ideal apportionment that distribution of moneys which is found in the most efficient school systems. I hope that some one will be able to make such tests within the next year for the cities from which the data were secured for this study.

RELATIONSHIPS

In the discussion of variability given above, it was suggested that a more careful study of the data given would enable us to measure exactly the relationships which exist among the various items of the budget. Such questions of relationship naturally suggest themselves when one considers the distribution of money for different purposes. Do cities which spend a large total amount per pupil spend a correspondingly large amount for teaching? As the amount per pupil increases, is more money spent for every purpose, or are there certain items of expense which do not increase in proportion to the increased cost per pupil? What is the relation between a large amount of money spent for supervision and the amount spent for text-books and supplies, fuel, repairs, etc.? If a larger proportion than usual of the money available for school purposes is spent for janitors' salaries, what effect may we expect this to have upon teachers' salaries? These and many other similar questions can be answered by determining the relationships which exist among the various items of the budget, on both the cost per pupil and per cent. of total bases.

From the tables of deviations of medians given above (Tables XXVIII to XXXIII), the fact that relationships exist might, perhaps, be inferred, but no one could from such large tables of details infer the particular relationships which do actually exist. It is just here that the Pearson Coefficient of Correlation is invaluable. The following explanations, adapted from Thorndike's *Educational Psychology* (page 26), will explain the

meaning of the coefficient of correlation to the reader not already familiar with its use.

"The coefficient of correlation is a simple figure so calculated from the several records as to give the degree of relationship between any two items which will best account for all the separate cases in the group. In other words, it expresses the degree of relationship from which the actual cases might have arisen with least improbability. It has possible values from + 100 per cent. through 0 to — 100 per cent."

A coefficient of correlation of + 100 % between two items of the budget (say teachers' salaries and text-books) on the basis of the cost per pupil would indicate that the city which spent the most for teachers' salaries, spent the most for text-books; that the city which spent the least for teachers' salaries, spent the least for text-books; that if the cities were ranged in order according to the amount spent for teachers' salaries, and then in order according to the amount spent for text-books, the two rankings would be identical; that the position of any city with reference to the others for one item will be the same for the other item (both being reduced to terms of the variabilities of the cost per pupil as units to allow comparison).

A coefficient of — 100 % would, *per contra*, mean that the city which spent most for one item would spend the smallest amount for the other, that any degree above the average or median in the one would be accompanied by the same degree below the average or median for the other, and *vice versa*. A coefficient of + 62 % would mean that (comparison being rendered fair here, as always, by reduction to the variabilities as units) any given station for one item would, on the whole, imply 62 hundredths of that station for the other. A coefficient of — 62 % would, of course, mean that any position above the average for the one item would, on the whole, involve a position below the average for the other item equal to 62 hundredths of the amount the first was above the average.

Table XXXVII gives the coefficients which were found on the cost per pupil basis. The first column gives the corrected coefficient [1] as determined from the coefficients found when the

[1] This correction is made by using the Spearman formulæ for the correction of the Pearson Coefficient. See *American Journal of Psychology* for January, 1904.

TABLE XXXVII

PEARSON COEFFICIENTS OF CORRELATION CALCULATED ON THE COST PER PUPIL BASIS.

	Corrected Coefficient (Spearman formula used).	Coefficient derived from the average of the first and second years' figures (30 cities).	Coefficient derived from first years' figures for cities reporting two years (30 cities).	Coefficient derived from second year's figures (30 cities).	Coefficient derived from first year's figures for all cities reporting (68 cities).
Total Cost per Pupil correlated with Teaching and Supervision	+1.015[1]	+.97	+.96	+.99	+.88
Total Cost per Pupil correlated with Janitors' Salaries	+ .716	+.66	+.70	+.56	+.73
Total Cost per Pupil correlated with Text-Books and Supplies	+ .955	+.85	+.85	+.67	+.64
Total Cost per Pupil correlated with Fuel	+ .522[2]	+.45	+.50	+.34	+.40
Total Cost per Pupil correlated with Repairs	+ .246	+.24	+.47	+.56	+.35
Teaching and Supervision correlated with Janitors' Salaries	+ .746	+.64	+.63	+.44	+.53
Teaching correlated with Text-Books and Supplies	+ .737	+.63	+.76	+.35	+.65
Supervision correlated with Text-Books and Supplies	+ .869	+.69	+.57	+.51	+.27
Supervision correlated with Repairs	− .128	−.14	+.18	−.09	+.07
Supervision correlated with Teaching	+ .366	+.27	+.31	+.05	+.12
Supervision correlated with Fuel	+ .11	+.06	+.02	+.04	+.01
Janitors' Salaries correlated with Fuel	+ .531	+.30	+.61	−.08	+.45
Janitors' Salaries correlated with Repairs	+ .219	+.32	+.32	+.39	+.24
Repairs correlated with Fuel	+ .147	+.12	+.21	−.001	+.20

[1] That this coefficient as corrected gives over 100 % is due to the fact that the third decimal place is lacking in the coefficients from which the correction was made.

[2] The item "fuel" as reported for the two years is less definite than most of the other items, because fuel bought, or at least fuel paid for, one year is often used the next year; consequently, only the second method given by Spearman for the correction of the Pearson coefficient is used. This method is based on the fact that an increase in the number of measures of each of the facts originally measured increases its accuracy.

first year's figures alone were used, when the second year's figures alone were used, and when the average for the two years was used (see columns 3, 4, and 2). The second column gives the coefficients derived from the average of two years' figures; the third, the coefficients derived from the first year's figures from cities reporting two years; the fourth, the coefficients derived from the second year's figures; and the fifth, the coefficients found when the figures for the fifty-eight cities reporting the first year were used.

In the discussion which follows, the coefficients referred to are always the corrected coefficients, unless it is specifically stated that other coefficients are meant. I believe that the corrected coefficient more nearly expresses the relationship which actually exists among the various items correlated than does any other figure.[1]

The first question which our coefficients enable us to answer concerns the relationship of the total cost per pupil to the principal items of the budget. Does an increased cost per pupil mean a proportionate increase in the amount spent for teaching and supervision, for janitors' salaries, for text-books and supplies, for fuel, and for repairs; or is the relationship between the total cost per pupil and the various items of the budget closer for some than for others? Examining our coefficients we find that the relationship between the total cost per pupil and the cost for teaching and supervision is expressed by a coefficient of + 100 % (see explanation under Table XXVII), *i. e.*, the amount spent for teaching and supervision is determined by the total amount spent per pupil. If a small total amount per

[1] The true relationship between any two items in the budget for these cities is the relationship which would be found if we had perfect measures of the cities' tendencies to spend money for school; such, for instance, as their budgets for forty or fifty years. The effect of chance deviations of any single year from the cities' general tendencies is to bring the calculated correlation from its true value toward zero. By the Spearman formulæ we estimate the true relationship (1) from the obtained relationship and the amount of deviation of one year's budget from another year's, or (2) from the difference between the relationship obtained from one year's budget and that from two or more years' budgets. For the theory of the correction see, in general, Thorndike, *Mental and Social Measurements*, pp. 128 and 129, and in detail C. Spearman, on "The Proof and Measurement of Association between Two Things," *American Journal of Psychology*, January, 1904.

pupil is spent, we may expect a correspondingly small amount per pupil for teaching and supervision; if a large total amount per pupil is spent, we may expect a correspondingly large amount per pupil for teaching and supervision; if the cities were ranked in order on the basis of total amount spent per pupil, and then in order on the basis of the amount spent per pupil for teaching and supervision, we would expect to find that the rank of the cities would be the same for each item. The next closest relationship is that for text-books and supplies, which gives a coefficient of + .955. The others are, in order, janitors' salaries, + .716; fuel, + .522; and repairs, + .246. In general, these relationships show that the amount spent per pupil for teaching and supervision, and for text-books and supplies, corresponds very closely to the total amount spent per pupil; if the cost per pupil is above the average, we may expect that the amount spent per pupil will be high for these items, and any diminution in the total amount spent per pupil is likely to be accompanied by a smaller expenditure per pupil for these purposes.

The coefficients found for janitors' salaries and fuel show a less close correspondence. From the relationship here we may infer that the rank of any city above or below the median in total cost per pupil might be compatible with various ranks for janitors' salaries or fuel, which would tend to be approximately three fourths of the rank in total cost per pupil.

The item of repairs is least closely related with the total cost per pupil. This is as we might have expected. The fact that a school system is expensive does not increase the cost of repairing the buildings, except in so far as the labor necessary to do the work may cost more in those cities which are able to spend the large amount per pupil. We might expect the expensive city to keep its buildings in better repair than the poorer cities, which, with the difference in the cost of labor mentioned above, would seem to account for the coefficient of + .246.

The fact that we find a direct relationship between the total cost per pupil and the cost per pupil for each of the principal items of expenditure makes it clear that, in general, an expensive school system is expensive because it spends more money for everything, and that an inexpensive school system is one that retrenches all along the line. However, the fact that certain of the items are less closely related to the total cost per

pupil than others does indicate that these items will probably not be found to increase or decrease in a proportion equal to that of the items showing a closer relationship, nor in proportion to the increase in the total cost per pupil.

Table XXXVIII shows just how an increased or a decreased total cost per pupil affects the principal items of the budget. The figures given refer to dollars, and are calculated from the average amount spent for each item for two years. The data are from thirty cities reporting for the school years 1902–1903 and 1903–1904.

TABLE XXXVIII

	Total Cost per Pupil.	Teachers' Salaries.	Supervision.	Teaching and Supervision.	Janitors' Salaries.	Text-Books and Supplies.	Fuel.	Repairs.
Average for the five cities nearest the median	$29.00	$17.80	$2.20	$20.00	$1.90	$1.80	$1.90	$1.60
First group of five cities above the median group	31.00	19.20	3.20	22.40	1.80	1.30	1.90	1.30
Second group of five cities	34.10	21.80	2.30	24.10	2.20	1.80	2.20	1.30
The two cities having the greatest expense per pupil	51.70	30.80	5.40	36.20	2.80	4.80	2.20	2.00
Average for the five cities nearest the median	29.00	17.80	2.20	20.00	1.90	1.80	1.90	1.60
First group of five cities below the median	27.70	18.20	1.30	19.50	1.90	1.60	1.50	1.30
Second group of five cities	25.50	15.70	2.40	18.10	1.50	1.60	1.40	.90
The three cities having the smallest expense per pupil	20.80	13.60	1.60	15.20	1.10	1.10	1.50	.60

EXPLANATION OF TABLE XXXVIII

The first line of the table gives the average total cost per pupil and the average amount spent for each of the principal items of the budget, for the five cities which have a total cost per pupil nearest the median total cost per pupil. The next line gives the same information for the group of five cities having the next highest total cost per pupil. The next two

lines are explained in like manner. The fifth line repeats the first line. The sixth line gives the average total cost per pupil and the average expenditure for the several items of expenditure for the five cities which have the next lowest total cost per pupil below the median group. The next two lines are explained in like manner.

From this table (XXXVIII) the relationships already shown by the coefficients of correlation given in Table XXXVII are made clear. In general, the table shows that an increased cost per pupil means an increased expenditure for each item, and that a decreased total cost per pupil is accompanied by a decrease in the amount spent per pupil for everything. An increase of two dollars in the total cost per pupil (see line 2) is accompanied by an increase of $2.40 per pupil in amount spent for teaching and supervision, and a decrease in janitors' salaries, text-books and supplies, and repairs, while fuel remains the same. In the next group, however, with an increase in total cost per pupil above the median group of $5.10, teaching and supervision show an increase of $4.10, janitors' salaries and fuel show an increase of thirty cents each, text-books and supplies remain the same, and repairs decrease thirty cents per pupil. The next group, with an increased total cost per pupil of $22.70, gives an increase for teaching and supervision of $16.20, an increase for janitors' salaries of ninety cents, an increase for text-books and supplies of $3, an increase for fuel of thirty cents, and an increase for repairs of forty cents per pupil.

By examining the part of the table giving the expenditures for groups of cities spending less than the median group, we find the decrease in all items more constant than was the increase for the cities spending more than was spent by the median group. The very fact that the city spends less than the average probably means that it would be very difficult to keep the expenditure in any one item up to the average without eliminating other necessary expenditures. On the other hand, a city spending more than the average can put the additional money in any place where the demand, of one kind or another, may be strongest.

Let us return again to a consideration of the relationships given in Table XXXVII. The relationship (+ .746) between teaching and supervision and janitors' salaries tends to confirm

the observation made above with reference to the relation between these items and the total cost per pupil. We may not expect janitors' salaries to correspond so closely to the total cost per pupil as do teachers' salaries. Apparently there are causes other than those (the cost per pupil of teaching and supervision) which influence the amount per pupil spent for janitors' salaries.

The coefficients for teaching and for supervision with text-books and supplies (+.737 and +.869, respectively), indicate a closer relationship between the cost per pupil for supervision and for text-books and supplies than exists between the cost per pupil for teaching and for text-books and supplies.

That the relationship between supervision and repairs is negative (−.128) might seem to imply that high-priced supervision means better care of buildings. The coefficient of supervision correlated with teachers' salaries is +.366. This is rather smaller than one might have expected. It is rather natural to suppose that high-priced supervisors would want high-priced teachers, and that a city spending a large amount per pupil for teachers would spend a correspondingly large amount for supervision. The small coefficient found for supervision correlated with fuel (+.11), seems to indicate that while greater expense for supervisors increases the amount spent for text-books and supplies (see coefficient for supervision with text-books and supplies), it has little in common with the expense for fuel.

The relationship between janitors' salaries and fuel, and janitors' salaries and repairs, is expressed by coefficients of +.531 and +.219, respectively. It will be remembered that fuel is more closely correlated with the total cost per pupil than is janitors' salaries. This being true, it would seem that the correspondence between janitors' salaries and fuel might be accounted for by the fact that they are both determined largely by the total amount spent per pupil. It was found also that supervision and repairs show a negative relationship, and here we find a positive relationship between janitors' salaries and repairs nearly equal to the relationship between repairs and the total cost per pupil. Apparently costly supervision means more for economy in repairs than does a large amount per pupil spent for janitors' salaries.

The next table (No. XXXIX) gives the coefficients which were calculated on the "per cent. of total" basis.

These coefficients show what effect the spending of a certain proportion of the money available for one item has on the proportion spent for other items.

TABLE XXXIX

PEARSON COEFFICIENTS OF CORRELATION CALCULATED ON THE PER CENT. OF TOTAL BASIS.

	Corrected Coefficient (Spearman formula used).	Coefficient derived from the average of first and second years' figures (30 cities).	Coefficient derived from first year's figures for cities reporting two years' figures (30 cities).	Coefficient derived from second year's figures (30 cities).	Coefficient derived from first year's figures for all cities reporting (58 cities).
Teaching and Supervision correlated with Janitors' Salaries	−.356	−.30	−.25	−.43	−.48
Teaching correlated with Text-Books and Supplies	−.746	−.46	−.09	−.59	−.12
Janitors' Salaries correlated with Fuel	−.024	−.03	+.12	−.33	+.26
Janitors' Salaries correlated with Repairs	+.155	+.17	+.12	+.48	+.13
Supervision correlated with Text-Books and Supplies	+.203	+.17	+.17	+.27	+.01
Supervision correlated with Repairs	−.409	−.28	−.06	−.38	+.03
Supervision correlated with Teaching	−.983	−.68	−.54	−.69	−.67
Supervision correlated with Fuel	−.333	−.20	−.17	−.03	−.02
Repairs correlated with Fuel	+.195	−.03	+.003	+.12	+.23

In this table (XXXIX) the significant thing is not so much the size of the positive or negative coefficients as the order, the *relative* closeness of relationship or opposition among the various items. Rearranging the table on this basis and calling the median relationship zero, and transmuting the others on this basis, the following table is derived:

		Transmuted Coefficients.
Supervision correlated with Teaching	−.983	−.650
Teaching " " Text-Books and Supplies	−.746	−.413
Supervision " " Repairs	−.409	−.076
Teaching and Supervision correlated with Janitors' Salaries	−.356	−.023
Supervision correlated with Fuel	−.333	0
Janitors' Salaries correlated with Fuel	−.024	+.309
" " " " Repairs	+.155	+.488
Repairs correlated with Fuel	+.195	+.528
Supervision correlated with Text-Books and Supplies	+.203	+.536

I believe that the transmuted coefficients more nearly express the true relationship than do those originally found, for we must have expected a negative relationship between any two items, because a larger proportion than usual spent for one item leaves a smaller proportion of the total to be divided among the other items of the budget. So far as the coefficients obtained enable us to judge, this negative relationship, due simply to the fact that a larger proportion of money than usual spent for any one item leaves a smaller proportion for other items, is approximately the relationship half-way between the extremes,—the relationship between supervision and fuel, $-.333$. If we call this relationship zero, the transmuted relationships give us, as nearly as we can obtain them, the relationships between the other items freed from this constant error.

Let us consider the transmuted coefficients. Suppose a city spends more than the usual proportion for supervision, what other items may we expect to find receiving an unusual proportion of the money spent? The coefficient of $+.536$ between supervision and text-books and supplies indicates that the probability is that a city which spends a large proportion for one of these items will spend a large proportion for the other,—that we may expect to find some cities unusual both in respect to the proportion spent for supervision and that spent for text-books and supplies. The positive coefficients between janitors' salaries, fuel, and repairs, no matter which two are taken together, shows that in cities where one of these items is proportionately large, the others will probably receive more than the usual proportion. Comparing these coefficients with those found for teaching and supervision with janitors' salaries and supervision with fuel, it is suggested that some boards of education are interested particularly in the physical side—the buildings, their care, etc.,—and that this over-emphasis on this side means less money for the purely educational activities. The very large negative coefficient for supervision correlated with teachers' salaries would doubtless be reduced if more accurate reports of the amounts spent for each of these items were available. It is in this relationship between the two items that any mistakes in reporting in either an amount which really belonged to the other would be most apparent. Any amount reported as teaching which should have been given as supervi-

sion would make the amount for teaching too large and the amount for supervision too small, and the opposite would be true if an amount which should have been reported as teaching were given as supervision. In either case, such mistakes would make this particular coefficient show a more pronounced negative relationship than actually exists. Such mistakes would not, however, have a like effect on other coefficients, where the increase or decrease in the item of supervision or teaching has no effect on the other item correlated. The fact that the amounts given for teaching or supervision may in one case be slightly too large and in another slightly too small, means that, except when the two items themselves are correlated, the mistake in one direction would be offset by the mistake in the other.

The relationship between teachers' salaries and text-books and supplies (— .413) is particularly interesting when contrasted with the relationship between supervision and text-books and supplies (+ .536). If a city spends an undue proportion for supervision we may expect that an unusually large proportion will be spent for text-books and supplies; while the opposite condition holds for the proportion spent for teaching. Possibly the relationship between supervision and text-books and supplies is simply that the highly paid supervisors are able to get appropriations for books and supplies, and that poorly paid supervisors do not have the ability or influence, rather than that the supervisors have much to do with the actual use or waste of supplies furnished. On the other hand, if there is anything that a good teacher wants, it is plenty of books and supplies of the right quality, consequently it seems strange that there should be this opposition in the relative proportions spent for these two items. However, expensive teachers may effect economy by the proper use of materials, and poorly paid teachers may be the most careless. There is nothing that hurts a book so little as using it properly, and it is conceivable that the best teachers may actually use fewer supplies than those with less ability.

Table XL gives the correlation of the first and second years' figures on both the cost per pupil and per cent. of total bases. These coefficients give us some idea of the relative stability of the various items of the budget. They are used also in making the Spearman correction.

TABLE XL

First and second year's figures correlated. Thirty cities reporting for the school years 1902–03 and 1903–04.

I—Cost per Pupil Basis

Total cost per pupil	correlated with	total cost per pupil	.....	+.92
Supervision and teaching	correlated with	supervision and teaching		+.89
Supervision	"	" supervision	.....	+.69
Teachers' salaries	"	" teachers' salaries	.....	+.79
Janitors' "	"	" janitors' "	.....	+.90
Text-books and supplies	"	" text-books and supplies	..	+.89
Fuel	"	" fuel	.....	+.17
Repairs	"	" repairs	.....	+.34

II—Per Cent. of Total Basis

Supervision and teaching	correlated with	supervision and teaching		+.56
Supervision	"	" supervision	.....	+.58
Teachers' salaries	"	" teachers' salaries	.....	+.51
Janitors' "	"	" janitors' "	.....	+.80
Text-books and supplies	"	" text-books and supplies	.	+.65
Fuel	"	" fuel	.....	+.34
Repairs	"	" repairs	.....	+.54

The total cost per pupil gives a coefficient of + .92, showing that the amount per child spent does not vary much from year to year,—the expensive city remains so, and the city spending little does not suddenly devote a much larger proportion of its revenues for schools. Almost as constant as the total cost per pupil are the amounts spent for janitors' salaries, text-books and supplies, teaching and supervision, giving, as they do, coefficients of +.90, + .89, + .89, respectively. The items of teaching and supervision, when taken alone, show greater variation (coefficients of + .79 and + .69, respectively), due largely to the fact that, in reporting, amounts properly belonging to one item were reported under the other, rather than in a change of policy as to the relative amount to be allowed for teaching and for supervision.

As one might expect, the amount spent for repairs varies more than any of the items mentioned above (a coefficient of + .34 was found). A large amount spent for repairs one year means a smaller amount the next year, rather than an equally large amount. That the coefficient for fuel is as low as + .17, might seem to indicate that fuel in excess of that which is used is often bought and paid for out of a single year's budget, rather

than that there is any very great difference in the value of the fuel actually consumed each year.

When we come to consider the proportion of the total which is spent for any one item for two successive years, we find the variability rather greater than for the amount spent per pupil. This is due to the fact that, while the amount per pupil spent for any one purpose remains fairly constant, any additional expenditure for some new item which increases the gross amount spent, or any diminution in any item of expenditure, affects the proportion which this item is of the total amount spent. It is interesting to note that in the relative constancy with which a given proportion is spent for any item, janitors' salaries lead, followed by text-books and supplies, supervision, teaching and supervision, repairs, teaching, and fuel (see part II of Table XL).

Table XLI gives the coefficients for the total cost per pupil correlated with the per cent. which each item is of the total. These coefficients tell us what effect a larger or smaller expenditure per pupil may be expected to have on the proportion which is spent for any one item of the budget.

TABLE XLI

PEARSON COEFFICIENTS OF CORRELATION

The total cost per pupil correlated with the per cent. which each item is of the total. The average cost per pupil and per cent. of total for two years is used as the basis of calculation.

Total cost per pupil correlated with per cent. of total spent for:

Teaching and Supervision	−.05
Janitors' Salaries	−.06
Text-Books and Supplies	+.35
Fuel	−.22
Repairs	+.13

Apparently the total cost per pupil may not be expected to affect the proportion spent for teaching and supervision and for janitors' salaries. Cities spending a large amount per pupil do not necessarily spend any greater proportion of their money for these purposes than do cities spending a smaller amount per child. (The coefficients of −.05 and −.06 are so small as to be practically negligible.) On the other hand, the positive co-

efficient of + .35 for text-books and supplies indicates that there is a direct relationship between the total amount spent per pupil and the proportion which is spent for this purpose. We may expect an expensive city to spend a larger proportion of its money for text-books and supplies than does the poorer city, even though we may infer from this coefficient that the increase in the proportion spent for this purpose will not be proportionate to the increased cost per pupil. The negative coefficient for fuel shows that the proportion spent for fuel decreases as the total cost per pupil increases. The most expensive city will probably spend a smaller proportion of its money for fuel than a poor city. That the proportion spent for repairs should give a positive coefficient of + .13 when correlated with the total cost per pupil seems to indicate that there is some tendency for the more expensive cities to spend a larger proportion for repairs than the less expensive city—possibly the cities spending the greater amount per pupil do keep their buildings in better repair.

Table XLII gives the average salary received by elementary and by high school teachers, and the average daily wage received by carpenters, bricklayers, and day laborers. This information was calculated from two years' data for the thirty cities reporting for the school years 1902–1903 and 1903–1904. The figure given for elementary and high school teachers' salaries was derived by finding first the average salary paid to each class of teachers for each year separately by dividing the gross amount spent for each item by the number of teachers (see form sent to superintendents), and then the average for the two years was taken. In a similar manner, from the report given by city superintendents on the blank filled out by them, the average wage of carpenters, bricklayers, and day laborers was calculated. The information concerning the daily wage of carpenters, bricklayers, and day laborers is probably less exact than we might wish, but sufficiently accurate, I think, to show whether or not any relationship exists between the amounts paid to this class of laborers and to teachers. It is for the purpose last mentioned that these data are given. Coefficients will be given to show what relationship exists between the wages paid carpenters, bricklayers, and day laborers and the salaries paid teachers.

TABLE XLII

No. of City.	Average High School Teachers' Salary.	Average Elementary School Teachers' Salary.	Average Daily Wage of Carpenters.	Average Daily Wage of Bricklayers.	Average Daily Wage of Day Laborers.
5.	$ 955.5	$643.1	—	—	—
6.	747.1	407.5	$2.50	$3.25	$1.75
8.	836.4	691.6	2.50	4.00	2.00
13.	930.	540.8	2.62	3.75	1.75
14.	820.8	425.9	3.00	4.50	2.00
15.	747.9	528.2	3.00	4.00	1.87
16.	770.5	386.4	3.12	3.68	1.50
20.	736.8	537.2	2.75	4.00	2.50
27.	563.3	350.6	—	—	—
28.	931.2	460.4	2.75	3.50	1.50
29.	760.9	452.5	2.50	3.25	1.75
30.	1,332.8	574.	3.50	4.65	2.25
31.	877.6	373.6	2.50	3.50	1.62
32.	801.8	538.1	3.25	4.25	2.00
34.	819.7	513.2	2.50	3.00	1.50
35.	702.8	482.5	3.00	4.00	1.50
36.	603.3	487.5	3.87	3.50	1.50
37.	657.1	381.7	2.90	4.00	1.85
39.	724.9	418.1	2.50	3.25	1.50
40.	732.9	366.2	2.50	2.50	1.50
41.	663.2	429.1	2.75	4.50	1.75
42.	776.5	486.1	2.62	3.30	1.50
43.	805.4	499.	2.60	3.55	1.75
45.	835.8	504.1	2.62	4.00	1.93
48.	558.	415.2	3.00	3.75	1.50
52.	876.7	594.5	2.85	4.00	1.50
54.	884.2	557.5	3.37	4.25	1.75
55.	645.8	399.6	2.75	3.50	1.50
56.	887.5	557.	3.50	3.67	2.45
57.	1,124.1	662.7	3.50	4.70	2.25

Before we give the coefficients showing the relationship between teachers' salaries and the wages paid carpenters, bricklayers, and day laborers, it is interesting to note the variability in teachers' salaries, as shown by the table given above. The average salary of the elementary school teachers varies from $350.60 in city No. 27 to $691.30—almost twice as much—in city No. 8. The average salary paid high school teachers varies from $558 in city No. 48 to $1332.80—almost two and a half times as much—in city No. 30. Whatever we may believe about the difference in the cost of living, no one would be willing to maintain that the cost of living in one of the cities is

double that in another of those covered by this study. In no case does the highest daily wage paid a carpenter, bricklayer, or day laborer, as reported, equal double that paid to the poorest paid laborer in any one of these occupations.

TABLE XLIII

PEARSON COEFFICIENTS OF CORRELATION

Salaries of teachers correlated with the daily wages of carpenters, bricklayers, and day laborers. The average salary of teachers and the average daily wage for two years are used as the basis of calculation.

Elementary Teachers' Salaries correlated with:	
Carpenters' Wages	+.28
Bricklayers' Wages	+.44
Day Laborers' Wages	+.57
High School Teachers' Salaries correlated with:	
Carpenters' Wages	+.25
Bricklayers' Wages	+.41
Day Laborers' Wages	+.57
High School Teachers' Salaries correlated with Elementary Teachers Salaries	+.63

The coefficients given above show an increased direct relationship between teachers' salaries and the daily wages paid artisans and day laborers as we go from carpenters, to bricklayers, to day laborers. If the wages paid to day laborers are an index of the cost of living, we may infer that cost of living does enter as a determining factor in the amount paid to teachers; not that the amount of salary paid to the teacher corresponds exactly to the cost of living, but that the tendency will be for cities where living is high to pay rather more than the average salary, and for cities where the cost of living is below the average, to pay its teachers less than the average.

TABLE XLIV

Coefficients of correlation calculated on the cost per pupil basis, the figure used in finding the cost per pupil being half-way between the average number of pupils in daily attendance and the average daily enrolment. Forty-nine cities, reporting for the year 1902–1903.

Total cost per pupil	correlated	with	Teaching and Supervision	+.93
" " "	"	"	Janitors' Salaries	+.82
" " "	"	"	Text-Books and Supplies	+.71
Teaching and Supervision	"	"	Janitors' Salaries	+.65
Teaching	"	"	Text-Books and Supplies	+.66
Supervision	"	"	" " "	+.34
"	"	"	Repairs	+.15
"	"	"	Teaching	+.15
Janitors' Salaries	"	"	Fuel	+.40
" "	"	"	Repairs	+.45

If these coefficients are compared with those given for the first year's figures in Table XXXVII, they will be found to agree in the main with them. Whatever variation is found is due largely to the fact that on the basis on which this table is computed, nine cities had to be omitted because they did not furnish the necessary data for the average daily enrolment.

Table XLV, which follows, shows the relation between the proportion of pupils attending elementary and high schools, and the proportion of the total amount spent for salaries which is used for the salaries of the two classes of teachers. The table also gives the number of students enrolled per teacher, which offers another basis for comparison as between elementary and high school teachers. The number of pupils as given in this table is in every case the average as found from two years' total enrolment figures. In determining the number of teachers, and in determining the amount of money spent for each group, kindergarten teachers and teachers of special subjects, such as nature study, manual training, etc., are counted as elementary school teachers.

EXPLANATION OF TABLE XLV

The first column gives the average total number of pupils enrolled in all day schools; the second, the number enrolled in elementary schools, including kindergartens; the third, the number enrolled in high schools. The fourth, fifth, and sixth columns give total amount spent for all day school teachers' salaries, the amount spent for elementary school teachers' salaries, including the salaries of kindergarten and special teachers, and the amount spent for high school teachers' salaries, respectively. The seventh and eighth columns give the per cent. of the total number of pupils enrolled who are enrolled in the elementary school, and the per cent. of the total amount spent for teachers' salaries which is spent for the salaries of elementary school teachers. The ninth and tenth columns give the same information for high schools. The eleventh and twelfth columns give the number of pupils enrolled per teacher in both elementary and high schools.

The proportion of the total expenditures, or of the amount spent for salaries, which is spent for the teachers of one class or the other has little significance, except as we are able to compare it with the proportion of the total number of pupils which are enrolled in each class of school. That a city spends 18 % of the total amount spent for maintenance and operation for high school teachers' salaries, means one thing when the city enrolls

17 % of its total number of pupils in high schools, and quite another thing when the city enrolls 8.5 % of the total number in high schools.

The number of pupils enrolled in the elementary schools varies from 71 % to 96 % of the total number of pupils enrolled, while the money spent for the salaries of elementary school teachers varies from 56 % to 91 % of the total amount spent for salaries of day school teachers. The median for elementary teachers' salaries is 78.8 % of the total amount spent for salaries, while the median for the enrolment in elementary schools is 90.1 % of the total enrolment in day schools.

For high schools the variability for the proportion of total enrolment has a range of from 4 % to 29 %, while the high school teachers receive from 9 % to 44 % of the money devoted to teachers' salaries. The median for high school teachers is 21.2 % of the total amount spent for salaries, while the median for the enrolment in high schools is 9.9 % of the total enrolment in day schools. In seventeen out of twenty-nine cases, the proportion of the total amount spent for salaries which is spent for high school teachers' salaries is two, three, or even four times the proportion which the high school enrolment is of the total enrolment. Of the remaining twelve cases, seven show a proportionate expenditure for high school teachers' salaries almost double the high school's proportion of the total number of pupils.

The number of pupils enrolled per teacher in the elementary schools varies from 35 to 54, while in the high schools the number varies from 17 to 43. The median number of pupils per teacher is 44 for the elementary schools, and 27 for the high schools. In general, the enrolment per teacher for the elementary schools is about one and one-half times the enrolment per teacher in the high schools.

If we may take the amount spent for salaries as an index of the relative cost of high and elementary school education, we must conclude from the data given above that secondary education costs two, three, or even four times as much per pupil as elementary education. What we would like to have is the expenditures for high schools separate from those for elementary schools in order to be entirely certain of the relative cost of elementary and secondary education. I believe, however, that

TABLE XLV

Number of City.	Total Number of Pupils Enrolled; Average for Two Years.	Number of Elementary School Pupils; Average for Two Years.	Number of High School Pupils; Average for Two Years.	Total Amount Spent for Teachers' Salaries; Average for Two Years.	Amount Spent for Elementary School Teachers' Salaries; Average for Two Years.	Amount Spent for High School Teachers' Salaries; Average for Two Years.
5.	4,286	3,796	490	86,850	65,350	21,500
6.	2,200	1,911	289	31,128	22,396	8,732
8.	2,436	2,139	297	39,570	30,845	8,725
13.	4,049	3,765	284	60,395	51,545	8,850
14.	1,738	1,598	140	25,932	28,957	4,975
15.	5,587	5,038	549	75,531	62,137	13,394
16.	1,220	1,136	84	17,285	13,432	3,853
20.	2,969	2,662	307	42,436	33,184	9,252
27.	2,167	1,831	336	22,595	16,413	6,182
28.	2,231	2,143	88	28,583	23,927	4,656
30.	3,747	3,428	319	76,185	59,628	16,557
31.	3,651	3,433	218	43,992	36,193	7,799
32.	2,999	2,728	271	41,268	35,268	6,000
34.	1,867	1,684	183	30,843	24,285	6,558
35.	5,162	4,407	755	82,351	66,891	15,460
36.	1,633	1,350	283	24,439	18,102	6,337
37.	3,255	2,886	369	30,491	23,262	7,229
39.	1,981	1,641	340	30,652	22 362	8,290
40.	2,138	1,510	628	30,963	17,402	13,561
41.	4,533	4,022	511	54,086	42,803	11,283
42.	4,214	3,798	416	48,937	37,687	11,250
43.	3,094	2,636	458	46,301	36,244	10,057
45.	4,142	3,867	275	60,237	48,537	11,700
48.	1,161	1,098	63	12,099	10,424	1,675
52.	4,978	4,680	298	58,192	50,555	7,637
54.	1,949	1,803	146	38,300	31,650	6,650
55.	2,440	2,201	239	21,762	18,200	3,562
56.	2,126	2,029	97	39,725	36,175	3,550
57.	3,072	2,692	380	74,495	55,645	18,850

TABLE XLV (*Continued*)

Number of City.	Per Cent. of the Total Number of Pupils who are Enrolled in Elementary Schools; Average for Two Years.	Per Cent. of the Total Amount Spent for Salaries; that is, Spent for Elementary Teachers' Salaries; Average for Two Years.	Per Cent. of the Total Number of Pupils who are Enrolled in High Schools; Average for Two Years.	Per Cent. of the Total Amount Spent for Salaries; that is, Spent for High School Teachers' Salaries; Average for Two Years.	Number of Pupils per Teacher for Elementary Schools.	Number of Pupils per Teacher for High Schools.
5.	88.5	75.2	11.5	24.8	43	22
6.	86.9	72.0	13.1	28.0	50	25
8.	87.7	77.9	12.3	22.1	47	27
13.	93.	85.3	7.	14.7	38	30
14.	91.8	80.9	8.2	19.1	35	23
15.	90.1	82.3	9.9	17.7	48	31
16.	93.1	77.6	6.9	22.3	35	17
20.	89.6	78.3	10.4	21.7	49	28
27.	84.4	72.6	15.6	27.4	47	31
28.	96.1	83.7	3.9	16.3	44	18
30.	91.4	78.2	8.6	21.8	38	26
31.	94.1	82.2	5.9	17.8	38	24
32.	90.9	85.4	9.1	14.6	47	36
34.	90.1	78.8	9.9	21.2	39	23
35.	85.4	81.2	14.6	18.8	38	34
36.	82.8	74.2	17.2	25.8	42	27
37.	88.5	76.3	11.5	23.7	54	34
39.	82.9	72.8	17.1	27.2	37	30
40.	70.6	56.2	29.4	43.8	49	34
41.	88.8	79.1	11.2	20.9	47	30
42.	90.2	77.0	9.8	23.0	56	29
43.	85.3	78.3	14.7	21.7	40	36
45.	93.4	80.6	6.6	19.4	43	19
48.	94.7	86.1	5.3	13.9	48	21
52.	94.0	86.9	6.	13.1	50	35
54.	92.5	82.6	7.5	17.4	35	20
55.	90.2	83.6	9.8	16.4	54	43
56.	95.4	91.1	4.6	8.9	46	24
57.	87.7	74.7	12.3	25.3	38	22

the item of salaries is a good index, first, because the item of salaries forms from 60 % to 80 % of the entire budget; and, second, because other expenditures for books, supplies, and apparatus are enough larger, in proportion to the number of pupils enrolled, in the high school to offset an expenditure of the same amount per pupil for janitors' salaries, fuel, repairs, etc.

CONCLUSION

This section will give a brief general summary of the results which have already been obtained, and some practical suggestions which grow out of these facts. First, with regard to variability, it will be remembered that the cost per pupil for the maintenance and operation of schools in the cities considered varies from $9 to $55. That this variation in the total cost per pupil is not due entirely to the relative wealth or poverty of the different communities is shown conclusively when we know that the cost of schools in cities in the United States varies from 6 % to 46 % of the total city expenditure.[1] An equally striking variability is found in the cost per pupil for each of the principal items of expense. Even when cities spending about the same amount per pupil are considered, it is found that the distribution of the money among the several items seems not to show anything like the degree of uniformity which might be expected (see page 44). It is found that the percentage of the total cost of maintenance and operation which is spent for teaching and supervision varies from 44 % to 82 %; and what possibly seems more astonishing is the fact that the city spending the smallest proportion for teaching and supervision, spends the smallest total amount per pupil. Janitors' salaries amount to from 3 % to 9 % of the budget; one city spends 3 % of its money for fuel and another spends 12 % for the same purpose; text-books and supplies cost from 1 % to 13 % of the total cost of maintenance and operation.

Fuel costs three times as much per pupil in one city as in another. The expenditure per pupil for the salaries of high school teachers varies from one and one half to four times the cost per pupil for salaries of teachers in the elementary schools.

[1] These results are from an unpublished study by Mr. E. C. Elliott, and were obtained by using the data found in the bulletins of the Commissioner of Labor.

In our consideration of relationships we found that an expensive school system is one that spends more than the usual amount for all of the principal items of expense. A large positive relationship exists between the proportion spent for supervision and the proportion spent for text-books and supplies. A lack of relationship between the total cost per pupil and the proportion which is spent for teaching and supervision seems to indicate that additional expenditures may not mean, as they should, a greater proportion for those items which count most for the efficiency of the schools.

These and the many other facts which are given above concerning the variability and interrelation of the principal items of expense for schools, prove conclusively that the problem of the business administration of city school systems is not only a real and vital one, but also that we may expect that the schools will increase in efficiency when the money devoted to public education is distributed among the various items in the best possible way. As has been stated, our final test can only be found by testing the pupils in the schools in order to rate different systems for efficiency, and then we must conclude that those cities which get the best results for a given expenditure per pupil are the cities which properly distribute their money. However, before any such comparison among the various cities can be made, we must have more detailed information with regard to the way in which the money is used. If we may not ask city superintendents or boards of education to report their expenditures according to a certain fixed form, it does seem that we might insist that their reports tell us for just what purposes the money is spent. A report which gave the various items of expense in detail would enable any one to compare cities according to whatever classification seemed best. Nor would such reports be without their value to the persons making them. If the administrator of schools is to secure additional money, either for purposes for which money is already used, or for any new field of activity, he can have no better argument than to be able to show just what results are obtained in his own and other cities from a given expenditure. Suppose, for example, that a superintendent wishes to introduce manual training or domestic science; he will be met immediately by the statement that these "fads" are expensive and not at all necessary as a

part of public education. Now, if it were possible for him to show from the reports of other cities that the additional expenditure was comparatively small, and that results obtained in the way of retaining pupils in school were considerable, he could make an argument which would have some weight.

If the greatest economy is to be had, it is essential that the accounting should show just how much money is spent for each item, and, within a system itself, how various schools compare. It should be possible for the administrative officer to tell just what the cost per pupil is for each school within the system, and to compare the relative cost with the relative efficiency as found by testing the pupils of each school. No great corporation would to-day continue to spend money for purposes for which no results could be shown, and no school system should so report its expenditures that it is impossible to tell how much the educational policies cost which it advocates and carries out.

It seems hardly right to expect that a superintendent whose time is already overcrowded, and who has as his assistant a clerk worth $500 a year, should be asked or expected to originate or carry out any such policy of accounting as has been suggested above. But when we recall again the great variability which is found for those items of expense which might be expected to be fairly constant, we feel that it is not out of place to suggest that the salary of a competent business agent or director might be paid out of the savings which would be made by the proper administration of the business affairs of the schools, and that the efficiency of the schools might be increased as the result of the proper distribution of the money spent. When the best judgment is used in the purchase and use of supplies and equipment as well as in the selection of teachers and supervisiors of instruction, when the money which is spent for schools is properly distributed among the various items of the budget, when expenditures are shown in reports in connection with the results obtained, then our schools will be found to have improved in efficiency, and then they will be able to command the respect and increased support of the community.

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TEACHERS COLLEGE RECORD

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THE EDUCATIONAL THEORIES OF HERBART AND FROEBEL

By JOHN ANGUS MAC VANNEL, Adjunct Professor of the Philosophy of Education.

The rough notes and suggestions furnished in this Syllabus are an attempt (*a*) to outline the evolution of educational ideas from Rousseau to Froebel as an outcome of the more general movement in social theory, (*b*) to relate the educational theories of Herbart and Froebel to the wider intellectual movements of Romanticism, Realism, and Idealism. It is assumed that no theory, ethical, philosophical, educational, can be completely understood when isolated from the human conditions which produced it. The evolution of educational opinion is part of the entire intellectual and social movement of a period. The outline aims to trace in a genetic way the emergence of certain ideas within a particular period and the transformation of educational problems by these ideas. It does not, however, underrate the value of the study of the personalities of the men through whom these ideas found their first adequate expression. A syllabus is at best a provisional sketch,—part seen, imagined part. Brevity without injury to clearness is in a very real sense possible only after the most detailed exposition. The syllabus of a period so complex as the one here outlined can be nothing more than a plan of action, serving its purpose if it in some small way assist students in the organization of such means of communication as may render easier the transition from one branch of knowledge to another. In the course the attempt is made gradually to formulate a methodology of the educational problem, and thus have it serve as an approach to a study of the Philosophy of Education.

The syllabus as a whole aims to indicate the nature of philosophic method in the study of the evolution of educational ideas rather than to increase the store of information concerning them. In the present outline the notes and references may prove suggestive in some directions: they are not intended to be exhaustive in any direction whatever.

I

THE PERIOD AND THE POINT OF VIEW

1. It is a matter of common knowledge that there cannot be any adequate appreciation of the educational theories of the present without some understanding of the foundations of such theories in the needs and aspirations, the intellectual and social tendencies of the past. To reach any definite conclusions in regard to fundamental tendencies in the present, a study is necessary of the previous conditions through which they passed in order to reach the present. For in any study involving personal and social progress there may be recognized certain well-defined conceptions formerly maintained, which, compared with the present, will indicate with a fair degree of security the line of future advance. Education is a dynamic, growing process, a part of a changing social situation: its theory is in turn a function of the wider intellectual and spiritual life of the particular period.

2. Educational theory, even while having its especial and clearly limited object, is closely involved in the life of each civilization, and, indeed, in the life of every people. In each age it acts upon the spirit of the people, and is in turn reacted upon by that spirit. In its development it is continuous with the development of other intellectual and social movements, of literature, art and science, of economics, politics and religion. In looking back over the history of the intellectual and social life of mankind it would appear to be true that transitional eras in scientific, ethical, political or religious thought were also eras of corresponding changes in educational theory and practice, *e. g.*, as the present outline will attempt to show, the development of educational ideas from Rousseau to Froebel is continuous with the simultaneous transformation and development of philosophical and social theories, the intellectual, moral and æsthetic products, of the period from Rousseau to Hegel.

3. It is still in many quarters an open question whether great educators should be thought of as heroes to be worshipped, as Carlyle would demand, or as representative men who are to be followed because they express what all are thinking, as Emerson would have us believe. Though, in many cases, not philosophers in any technical sense, the great educators inevitably became vehicles of philosophical ideas and of social tendencies. Indeed, their essential originality in most instances consists in the degree to which they were able to synthesize their educational beliefs with the dominant intellectual movements of their time. While, therefore, in the present outline, the emphasis is concerned with the evolution of ideas rather than the biography of writers, it would not underrate the necessity of maintaining a balance or proportion between persons and ideas. It is easy to over-emphasize either, and thus tend to give a very misleading view of a period such as the one under consideration. For in the thought and teachings of the great educational leaders, embodying, as we have seen, the philosophical and social tendencies of their period, is found a unique confirmation of the personal as well as the organic nature of human life: from the interdependence, moreover, of many and varied tendencies in literature, philosophy, political theory, ethics, and theology, one is inevitably led to a deeper view of human thought and activity, and of the spiritual foundations of both.

4. The period 'From Rousseau to Froebel' lies between what may rightly be regarded as two great events in the evolution of educational ideas, (*a*) the indictment of civilization and culture by Rousseau, and (*b*) the unique reconstruction of educational theory attempted by Froebel. The development of educational ideas in this period may be regarded either (*a*) as the expression of intellectual and spiritual tendencies and of recognized practical needs, or (*b*) from the point of view of the actual definitive clearness with which the problems themselves were stated, and solutions offered by educational leaders. In the present outline the attempt is made to indicate the possibilities of the study of the period from the twofold point of view.

5. The purposes of the present outline may now be given a somewhat more formal statement as follows:

(*a*) by the use of the comparative and historical method,

within a limited area, to indicate what were the more important problems with which the writers on education dealt, and what were the conditions, intellectual and social, which determined the various statements of the problems and the attempts at their solution. Since educational theory is an organic part of the wider history of culture, a syllabus can, at best, indicate in very schematic form the directions and interrelations of the intellectual and spiritual movements of a period to which its educational ideas were organic. Its peculiar danger lies in depriving the period of its natural continuity of movement and life.

(*b*) to outline the relation of the work of Herbart and of Froebel to its historical setting, and the dependence of their theories upon the philosophical movements of the period. This will necessitate some indication of the philosophical content of Idealism, Romanticism, and Realism.

(*c*) to indicate the contributions of Herbart and Froebel to a philosophy of education.

6. Before passing on to the outline of the period it may be well for purposes of simplification to indicate in somewhat dogmatic form what are to be regarded as the more important phases of the social problem in the period as a whole:

(*a*) The period is marked, first of all, by attempts at the reconciliation or adjustment of the two elemental human tendencies, that of individual freedom and collective organization. The worth of the individual and his right to self-realization came to fuller and fuller recognition. This movement at first took the form, for the most part, of reaction against all existing institutions; gradually, however, the lesson was learned that the individual life in itself is naught; only as a member of the great institutions of the race can the individual become truly human, spiritual and free.

(*b*) The period is marked, in the second place, by a gradual change from mechanical and static to organic and developmental modes of viewing nature and human society. In the place of the atomistic view of things, in politics, philosophy, theology, and education, the organic view of society, of experience, of the entire cosmic process, came to prevail. The mental gaze was transferred from the categories of 'being' to those of 'becoming.'

(*c*) In the period there may be noted a gradual transformation of the deistic to the theistic view of God's relation to the world. The mechanical Deism gave way to the more immanental and spiritual view of Theism, a view, at times, closely approximating to Pantheism.

(*d*) Closely connected with the preceding is the new conception of the relation and significance of nature to the human spirit. In place of the view which held to the absolute dualism of nature and spirit came the view of nature as the manifestation of the Absolute and as a medium through which the human spirit attains to self-knowledge and self-realization.

(*e*) As a final aspect of the social problem during this period may be noted the gradual change from an individualistic ethics to an ethics based upon the demands of the social whole. Closely connected with this, and contributing to it were those ideas and ideals of equality, humanitarianism, of an aristocracy of intelligence rather than birth, and of the new developments in psychological, historical, and physical science, in literature and art, in education and philanthropy. Corresponding to the new religious and ethical ideals there emerged in this transitional period new attitudes to nature, to humanity, to the responsibilities as well as the opportunities of life.

References:

The more important sources of material for the study of the period will be indicated in connection with the respective chapters. It is needless to say that *the* important sources are the works of the writers themselves. The study of the period is fundamentally a study of the influence and continuous action of *works on works*. The various lists make no pretension to completeness. They aim to be suggestive merely, not in any sense exhaustive. There are certain books which it is necessary for the student to know if he is to be saved from making discoveries which later turn out to be not discoveries at all. A few of the more important books, which, in addition to the writings of Rousseau, Kant, Goethe, Fichte, Hegel, Pestalozzi, Herbart, and Froebel, naturally form the nucleus of source-material for the study of the period (for the reason that they inevitably become incorporated sooner or later with our idea of the period) are the following:

Boyesen, *Essays on German Literature;* Caird, *The Critical Philosophy of Kant;* Dewey, *The Child and the Curriculum;* Erdmann, *History of Philosophy*, Vol. II; Falckenburg, *History of Modern Philosophy;* Francke, *German Literature as Determined by Social Forces;* Harris, *Psychologic Foundations of Education* (Part

III); Höffding, *History of Modern Philosophy;* Merz, *History of European Thought in the Nineteenth Century;* Robertson, *A History of German Literature;* Rosenkranz, *The Philosophy of Education;* Royce, *The Spirit of Modern Philosophy;* Scherer, *A History of German Literature;* Taylor, *Studies in German Literature;* Ueberweg, *History of Philosophy,* Vol. II; Willmann, *Didaktik;* Windelband, *History of Philosophy;* Wundt, *Ethical Systems.*

II

ROUSSEAU AND THE PROBLEM OF CIVILIZATION IN THE EIGHTEENTH CENTURY

1. The dominant tendencies of the intellectual life of the eighteenth century may be indicated as follows:

(*a*) A movement towards the emancipation of human thought and activity, and the liberation of man from the influence of past dogmas and traditions. The psychology of the 'Enlightenment' contained two fundamental propositions, borrowed from Leibnitz (while omitting the deeper implications of his doctrine): (1) ideas are the constituents of the mental life, and (2) the fundamental difference in mental life is the difference between dark and clear ideas. The 'Enlightenment' of the understanding became the watchword, and to the test of the 'understanding' every belief, institution, creed, must submit or be rejected.

(*b*) The ideal of Individualism which manifested itself in the prevailing theories of knowledge, of morality, and of human society. In addition to the notion borrowed from Leibnitz that ideas are the *constituent* elements of the mental life, a theory of the *origin* of these ideas had been derived from English Empiricism. A psychology grounded on experience and regarded as the fundamental science became the basis of attack in political, æsthetic, moral, and religious problems. (1) Locke declared, "All knowledge is from experience." Interpreting experience in terms of sensation, and materialistically, the Encyclopædists claimed that we have no knowledge of anything incapable of being experienced by the senses. (2) Pleasure or happiness was regarded as the legitimate end of the individual's action and enlightened selfishness the only rule of conduct.

(*c*) The prevailing Deism, or the tendency to so-called 'natural religion' of the period. In harmony with the dominant intellectualistic psychology noted above, it was at first argued that Christianity was not mysterious but reasonable, and that the value of religion could not lie in any unintelligible element. Difficulties still remaining, revealed religion came to be questioned and attacked as either superfluous or untrue or both. The outcome among many of the leaders of thought and opinion was either mere toleration of or thoroughgoing opposition to religious beliefs, both natural and revealed.

(*d*) The belief in a *state of nature* as man's primitive condition, by some writers regarded as a state of human equality, goodness, and happiness. Coupled with this is the ideal of the so-called *return to nature*. (Concerning the notion of a 'state of nature,' see Davidson's *Rousseau*, pp. 3–23.)

(*e*) The conception of the state or society as the outcome of a social contract consciously and voluntarily entered into by individuals for their own good.

From the preceding analysis it will be seen that the dominant characteristic of the eighteenth century was its individualism and its opposition to the accepted dogmas as well as the actual conditions in church and state: and the work of its representative thinkers and writers was directed chiefly towards the establishment of a new type of philosophy (theoretical and practical), based on the principles of individualism and naturalism. This tendency, indeed, had been gradually but steadily growing and formulating itself through the preceding three centuries. It came to clear consciousness in Rousseau as *the problem of civilization*. Since the Renaissance a new type of civilization and culture had been developing, and at length a voice was raised, asserting the falsity of the whole thing. Rousseau in the modern, as the Sophist in ancient times, was the first clearly to raise the question of the worth of civilization to the life of the individual. In all his writings this fundamental question reappears in one form or another and again and again: What is the value and significance of human history and human civilization for the morality and happiness of the individual? Is it true, indeed, that the growth of human knowledge and the increasing complexity of human relationships, inseparably connected with

so-called civilization, has been for the good of man as man, and made for his true happiness? Does not civilization hinder rather than enhance the happiness as well as the morality of man? In whatever form this question had hitherto expressed itself, back of it all we find the individual coming to a consciousness of himself, of his rights and powers, as independent of what he conceived to be the arbitrary environment which surrounded him. This reaction against authority, now manifest in the Renaissance, now in the Reformation, now in the development of Rationalism, and ultimately in the Revolution, brought the individual into sharp relief. It shows the individual continually becoming more conscious and more determined. The very meaning and significance of society came to be questioned. Is not society a merely artificial product? Does it not merely impede the individual, hinder his development, and thwart his freedom? Is not the individual man, after all, the measure of all things, the criterion of what things are true, and what things are good?

2. When we think of the spirit of the eighteenth century it is the name of Voltaire which almost inevitably comes to mind. When we consider the century by itself it is Voltaire who perhaps best of all embodies and represents the entire period. On the other hand, when we think of the eighteenth as preceding and conditioning in large measure the spiritual history of the nineteenth, it is rather to Rousseau and his work that we must turn.

While it is safe to consider Rousseau (1712–1778) as an epoch-maker in the history of thought, nevertheless to regard his work and that of his contemporaries as an absolute break with the past is to take an inadequate view of the entire movement which it is supposed to constitute. In the evolution of ideas it is difficult to determine just when a particular idea or tendency begins to operate. Failure to recognize the danger of selecting arbitrary starting-points for intellectual and spiritual movements is to lose sight of the essential continuity of human thought and experience. As a social phenomenon *Rousseauism* may be said to have been conditioned in its origin and in its course by the character of the period which had preceded it. It arose, it is true, in what seems a distinctly conscious break with the past. It was intended, indeed, that the past should be sud-

denly superseded, that the individual should be freed in thought and action. This very intention, however, had its own historic conditions, its own period of preparation in the past. The movements, therefore, connected with the name of Rousseau, were not altogether suddenly initiated, nor are they yet by any means finished processes. The principles which made them possible were at work in the preceding period, and even now those same principles are being carried to their fuller development.

In estimating the character and influence of Rousseau it is necessary to keep in mind two things: (*a*) his own nature, (*b*) his relation to the thought of his times. He was at once original and impressionable—an exponent perhaps more than the originator of ideas. However inconsistent at times his writings may appear, it is not a difficult matter to realize how completely they reveal the nature of the man as well as the character of the times in which he lived.

3. *Rousseau's Writings.*—As has been noted above, the one question fundamental to the thought of Rousseau is *civilization.* Partly owing to his own character and experience, and partly to the influences at work in the life about him, Rousseau became the interpreter or exponent of the tendencies and aspirations, and of the general temper of unrest prevalent in his time, and his writings *critiques* of existing institutions. (1) *Discourse on the Sciences and Arts*, 1750. In 1749 the Academy of Dijon proposed as a theme for a prize-essay the topic, "Has the restoration of the sciences contributed to purify or corrupt manners?" Rousseau's essay won the prize. Henceforth his attitude towards civilization as making for morality and happiness was a negative one. (2) *The Origin of Inequality*, 1753. (3) *The New Heloise*, 1761. An attack on the feudal family: his chief work as an imaginative writer. "The novelty of the book lay," writes Brandes, "in the first instance, in the fact that it gave the death-blow to gallantry, and, consequently, to the theory of the French classical period on the subject of the emotions. This theory was that all noble, fine emotions, and chief among them love, were the products of civilization." Brandes goes on to note more fully the four characteristic features: (i) Love as a natural, not artificial or conventional mannerism. (ii) Inequality in station of the hero and heroine. (iii) The moral

conviction of the sanctity of marriage. (iv) Nature in its literal significance. "For the first time, out of England, we have the genuine feeling for nature in fiction, superseding love-making in drawing-rooms and gardens." (*Main Currents of Literature in the Nineteenth Century*, Vol. I. For the influence of Rousseau on Goethe, see p. 20 *ff.* of the same volume.) (4) *The Social Contract*, 1762. Devoted to the political problem—the sovereignty of the people, the equality of men. "Man is born free but is everywhere in chains." The 'Social Contract' was but a part of a much larger scheme, as projected, of entire social equality. (5) *Émile*, 1763. Devoted to the educational and religious problem. "While others were content with the mere enunciation of maxims and precepts, he breathed into them the spirit of life, and enforced them with a vividness of faith that clothed education with the augustness and unction of religion" (Morley). (6) *Confessions*, 1782. Published four years after his death.

4. *The Social and Ethical Theories of Rousseau.*—(1) The theory of the State of Nature. Since, according to Rousseau, all that is natural, all that is good, all that is fundamentally human, has disappeared with advancing civilization and culture, the only relief for man from such universal degeneracy is to be hoped for from a return to nature on the part of the individual and society alike. And this return is to be achieved through a new type of education and the formation of a state conformed to nature. (2) The theory of the Social Contract. (3) The conception of the 'general will.' (4) Reaction against the Philosophy of the 'Enlightenment'—in psychology, in religion, in æsthetics. (5) Education as the fundamental form of social reconstruction. (See Chap. VI.) (5) In an appreciation and criticism of the doctrines of Rousseau the following points might be noted:

(*a*) Rousseau did well in forcing upon the reluctant mind of his generation the problem of civilization, its validity and its shortcomings. But the genius and temperament of Rousseau is destructive, rather than creative or reconstructive. While discerning what was transient in the civilization of his day, he was unable to indicate within it that which was of permanent significance for humanity.

(*b*) While he recalled his generation from a blind worship of the past, yet Rousseau's appreciation of the meaning and significance of history was wholly inadequate. As was to be shown by later writers, the importance of the past lies in its lesson for the present and future. The survival of beliefs, institutions, customs, is an evidence of their significance to the human spirit, and this is to be *estimated*,—not abruptly denied. Rousseau, however, had little, if any, appreciation of the continuity of history.

(*c*) Rousseau's notion of a 'state of nature' in which are realized both liberty and equality (as he uses the conceptions) seems impossible for man as at present constituted. If you have the one you cannot have the other. In Rousseau's conception of liberty the errors of individualism are set in clear relief. In failing to recognize that human life is essentially social and moral, he confounds mere natural spontaneity with that rational or spiritual freedom which is gained, as Kant maintains, through the limitation and control of mere natural spontaneity or desire in the presence of law. (See also Chaps. III and VI.)

(*d*) Though not a psychologist in the strict sense of the term, nevertheless Rousseau maintained a psychological attitude towards life, with the result that his works contain the germs of several divergent lines of thought and experience in the succeeding generation. While he was influenced by both Rationalism and Empiricism, yet for him the element of feeling is the central, the fundamental, element in the human mind. In Rousseau, Romanticism in large measure took its rise. "The man who has lived most is not he who has numbered the most years, but he who has the keenest sense of life." It was this element of feeling or passion which made Rousseau's influence a power. He infused into the ideas he accepted from his time this element of passion, and at once they became vital, influential in the minds and hearts of his readers. By vindicating with impassioned eloquence the right of the whole personality of the individual to participate in the solution of its deepest problems, in opposition to the one-sided 'understanding' of the 'Enlightenment,' Rousseau became a pre-Kantian defender of the faith of practical reason. His words found their response in Herder, Goethe, Schiller, Kant, Fichte, and Pestalozzi. His emotions were,

moreover, extremely complex,—now self-centered and selfish, now, to all appearances, altogether altruistic. He felt keenly the burden of human life in the France of his day, yet he too often regarded it as merely his own. In this passionate exercise of feeling there was something which constantly tended to carry him beyond a purely individualistic view of man, and to a more adequate conception of his relation to nature, to other men and to God than had hitherto prevailed. Although, for example, his notion of religion is still, in the main, deistic, yet connected with it is an emotional element which is an anticipation of a newer conception which was soon to follow. "I believe in God . . . because a thousand motives of preference attract me to the side that is most consoling, and join the weight of hope to the equilibrium of reason." Further his sympathy towards man has within it the promise of better things to come. "It is the common people," he writes, "who compose the human race: what is not the people is so trivial that it is not worth taking into account. Before one who reflects, all civil distinctions disappear; he sees the same passions, the same feelings in the clown as in the man of note and reputation; he only distinguishes their language, and a varnish more or less elaborately laid on." Thus Rousseau's somewhat emotional 'return to nature' had important bearings upon (1) the reaction against mere rationalism in matters of belief, (2) the movement towards democracy with its deeper and wider Humanism and its appreciation of the worth and dignity of man as man, (3) the appreciation of the significance of nature for the human spirit, and of its power to respond and minister to human needs. Rousseau's work, though for the most part destructive, contained within it elements which, later on, inevitably made for social reconstruction.

References:

Bonar, *Philosophy and Political Economy;* Bosanquet, *Philosophical Theory of the State;* Brunetière, *History of French Literature;* Davidson, *Rousseau and Education according to Nature;* Dieterich, *Kant und Rousseau;* Fester, *Rousseau und Geschichtsphilosophie;* Hudson, *Rousseau;* Levy-Bruhl, *History of Modern Philosophy in France;* Macdonald, *Studies in the France of Voltaire and Rousseau;* Morley, *Rousseau;* Ritchie, *Natural Rights;* Windelband, *History of Philosophy;* Wundt, *Ethical Systems.*

Further problems for study:

1. Sources of the doctrine of Rousseau.
2. Rousseau's psychology.
3. The concept of 'equality' in the writings of Rousseau.
4. Rousseau's theory of society.
5. The conception of civilization in Rousseau.
6. The conception of the 'general will' in Rousseau.
7. Rousseau's doctrine of nature and culture.
8. Rousseau's relation to Romanticism.
9. Influence of Rousseau on Kant, Goethe, and Pestalozzi.

III

THE TRANSITION PERIOD

1. The eighteenth century, though a period in which there existed a certain tendency to remain self-satisfied with the existing condition of things, was nevertheless in Germany, France, and England fraught with immense possibilities in politics, in industry, in science, in literature, in philosophy, and religion. The age led out beyond itself in many directions. In Germany, during the last quarter of the century especially, it became an era of transition in which new aspirations, new ideas of life and conduct became formative in the minds and hearts of men. In philosophy, literature and theology is found during this period the most fruitful contribution of Germany, where the period of transition took the form of intellectual rather than political or industrial revolution.

2. Without any attempt at completeness the following characteristics may be noted as the more important for the present purpose: (1) Its struggle for truth and the strengthening of the critical insight. (2) Its opposition of the original force and simplicity of nature to the artificial forms of culture and society. (3) The gradual prevalence of organic over mechanical modes of thinking, leading to new conceptions of God's relation to the world, of the interrelations of men and the relation and significance of nature to the spiritual life. (4) A tendency towards individualism and an emphasis of the subjective, personal aspect of truth, and an unceasing search for fresh spiritual life and light in art and literature, in philosophy and religion. (5) The struggle for freedom of conscience, the deepening of the

sense of the value of the individual, his right to self-realization, an ideal of human advancement through individual self-culture. Coupled with this is a new *Humanism* in literature, art, and moral theory.

3. (*a*) *Lessing* (1729–1781) *as Pathfinder*, "a man who, while combining in himself the enlightenment, the idealism, the universality of the best of his age, added to this an intellectual fearlessness and a constructive energy which have made him the champion, destroyer of despotism, and the master builder of lawful freedom" (Francke). The forerunner of classical German literature—Principal works—(1) *Minna von Barnhelm*, *Emilia Galotti*, *Nathan the Wise*, and *The Education of the Human Race;* (2) *Hamburg Dramaturgy*, and *Laocoon*. Their political, æsthetic, ethical and religious significance—Embodiments of those movements which were to make for human freedom, for social reconstruction and consolidation.

(*b*) In Lessing may be noted (1) the influence of the transitional period in which he lived. Neither the *orthodoxy*, the *pietism*, nor the *rationalism* of his day completely satisfied him. No radical innovator, Lessing aimed at *a gradual transformation of the existing state of things*. Through his attempts at literary and artistic reform, his search for the true lines of social progress, his demand for religious freedom, he became in his century a unique representative of the movement, not merely of emancipation but of reconstruction. (2) A passionate love of truth, a demand for freedom of thought and conscience and the conception of eternal striving as the true duty of man. "Not the truth of which any one is, or supposes himself to be, possessed, but the upright endeavor he has made to arrive at truth, makes the worth of a man. For not by the possession, but by the investigation, of truth are his powers expanded, wherein alone his ever-growing perfection consists. Possession makes us easy, indolent, proud.—If God held all truth shut in His right hand, and in His left hand nothing but the ever-restless instinct for truth, though with the condition of forever and ever erring, and should say to me,'Choose!'—I should bow humbly to His left hand, and say, 'Father, give! pure truth is for Thee alone.'" (Compare the ideas of Goethe, Kant, and Fichte.) (3) Closely connected with the idea of eternal striving is his possession of the historical sense,

his anticipation of the idea of organic growth and its resultant optimism. (4) A combination of cosmopolitan toleration and nationalism, an ideal of freedom whose foundations are laid in discipline, an individualism resting on habits of self-control and self-surrender. (5) The conception of feeling as the fundamental element of the psychical life. (6) The accordance of his views of God, the world and the human soul with those of Leibnitz. The idea of inner connection between nature and history. For Lessing, influenced by Spinoza, there exists an immanent rather than transcendent relation between God and the world, and reality as a whole is in a ceaseless process of becoming and development. God does not exist apart from the world: He is to be conceived, rather, as the soul of the world. (7) Influence of Lessing upon Herder and Goethe.

(*c*) In *The Education of the Human Race* (1780), perhaps the most suggestive of his writings, which is closely connected in many ways with *Nathan the Wise*, which preceded it, Lessing formulates his general ethical and philosophical position in the form of an ideal of religion,—of a new gospel. In this brief treatise is found an application of the Leibnitzian idea of development to the history of positive religions. The history of the various religions of the world is *an education of the human race through divine revelation.* In them we are not to find mere blind striving and error, but rather the only road by which the human mind in each instance has been able to develop, and along which it will develop still farther. What education is to the individual man, revelation is to the whole human race. By means of revelation the human race is raised from lower to higher stages. Every individual must traverse the same course as that by which the race attains its perfection; and just as the education of the individual puts nothing foreign or extraneous into him, but merely puts him in possession more quickly of that which he could have reached for himself, so is human reason illuminated by revelation concerning things to which it could have attained by its own unaided efforts, only that without the divine coöperation the process would have been infinitely more arduous and prolonged.

4. In Herder's interpretation of nature and history there may be noted: (*a*) Certain general characteristics of the mind and

work of Herder (1744–1803) which served to give him an influential place in the movement of ideas in this era of transition: (1) Endowed with wonderful spiritual vitality, deep feeling, profound interpretative power, Herder was able to vitalize the intellectual life of his time as was perhaps no other writer of the period. Compared with that of Kant, his mind was of the synthetic, the formative, rather than of the analytic or critical type. "Life, Love, Light," the words written on his tomb and on the statue at Weimar, embody the spirit and the spiritual aspirations of Herder. (2) In his refinement of the philosophy of feeling, of its basal character in the personal life, against the demand of mere reason or understanding, Herder may be regarded as a forerunner of Romanticism in Germany, as was Rousseau in France. He resembled the Romanticists also in his inability to keep his poetic, his philosophic and his religious ideas apart. (3) Through his study of primitive poetry and, notably, by his essay on Ossian, Herder taught the value of the poetry of the people as contrasted with that of the cultured. (4) As one who had in early life received much inspiration from Rousseau, Herder was a strong defender of the claims of nature, freedom, and the right of the individual to self-realization. From the point of view of ethics, he maintains against Kant, his former teacher, that the end of life must lie in the particular and individual rather than merely in the race. To each individual is allotted such development and perfection as is possible at the given stage. Yet Herder recognizes that this development is rendered possible only through (i) reciprocal action between individuals, and (ii) transmission of the acquired means of culture from generation to generation. It is this interrelation between individuals and generations which produces humanity and renders a philosophy of history possible. In the work of Herder as a whole there are the seemingly contradictory tendencies,—to hold fast equally to individualism and to collectivism, and, indeed, to pantheism.

(*b*) Herder's *Ideas for a Philosophy of History of Mankind* was published between 1784–1791. This work, with Kant's *Critique of Pure Reason*, gives utterance to the most important intellectual drift of the last century. In this book, says Pfleiderer, meet, as in a focus, the combined results of Herder's various philo-

sophical labors, labors which opened up new and magnificent points of view especially in those branches of study which were depreciated by Kant, viz., the emotional side of the life of the human soul and the development of mankind under the combined action of the natural and spiritual forces in history.

In an analysis of Herder's *Ideas* the following points should be noted: (1) His aim is to explain human evolution as ultimately an outcome of man's physical environment. Man is to be viewed as a part of nature—nature's last child, her first freedman—and his various forms of development as purely natural processes. In man is the meeting-point of the physical and ethical series. Kant, on the other hand, whom Herder opposed, viewed human evolution as the gradual manifestation of a growing faculty of rational free-will, and opposed it to the operations of physical nature. (2) He asserts the interconnection according to law of all things in nature and history. This presupposes a ground of unity in existence. "God is everything in His works." (3) In his conception of development Herder is dominated by Spinoza, Rousseau and Leibnitz. To Spinoza he owed much of his monistic conception of things, the unity of God and the world, of nature and spirit. With Rousseau, he lays stress on the earlier stages of human development, since because of their simpler and more spontaneous character (*cf.* Schiller) they appear to him the more real and valuable. His doctrine of organic forces is a transformation of Leibnitz's theory of monads. These forces, after the fashion of the active force in our thought, operate in different degrees and at various stages through all nature, which forms one vast organism. Even in unconscious nature, ideal forces unceasingly operate and organize in accordance with definite types. The lower forms of life prefigure man in unequal degrees of imperfection. (4) Since the development of man is to be explained in connection with his environment, his mental faculties are to be viewed in relation to his organization and as developed under the pressure of the necessities of life. The great law of nature is that everywhere on earth everything be realized that can be realized there: its end, — humanity and the development of human capacities. Preceding abstract thought there was the religious consciousness of the invisible forces in nature.

Reason is not innate: it is a product. Our thoughts have been acquired through tradition, speech, environmental influences. Man comes into the world to learn reason. This is nothing, Herder claims, other than something acquired, a proportion and direction of ideas and faculties which we must learn, and to which man, *according to his organization and way of life,* must be educated. The individual becomes man only through a process of education, and education proceeds through the participation of the individual in the life of the race.

5. (*a*) Kant (1724–1804) once declared that, after all, the greatest, and perhaps sole, use of philosophy is merely negative, and, instead of discovering truth, has only the more modest merit of preventing error. His own work resolves itself into a *critical* account of the nature, possibility and limits of human experience. Starting from the accepted order of nature and the moral order acknowledged in the conviction of duty, Kant seeks to answer the question, What do these imply? His account is embodied in the three Critiques: (1) the *Critique of Pure Reason* (1781), presenting an epistemological view of experience, (2) the *Critique of the Practical Reason* (1788), in which Kant develops an ethical interpretation of experience on the basis of results reached in the epistemological, (3) the *Critique of Judgment* (1790), in which the attempt is made to develop an æsthetic and teleological interpretation of the world.

(*b*) In attempting to give a reasonably adequate statement of important factors in the work of Kant it would be necessary to give an analysis of the following: (1) his relation to Empiricism (Hume), to Rationalism (Leibnitz), to Dualism (Descartes), and to Naturalism (Rousseau); (2) the meaning of the *critical* method; (3) the significance of *the problem of the possibility of experience;* (4) the distinction between the *matter* and *form* of knowledge; (5) the nature of the three fundamental forms, space, time, causation, as *functions* of human intelligence; (6) the doctrine of the categories; (7) the doctrine of freedom; (8) the categorical imperative; (9) the Kantian doctrine of personality; (10) the interpretation of the adaptation of nature to intelligence. In this connection it is only possible to indicate very briefly the outcome of *the Kantian theory of knowledge.*

(*c*) Kant's Epistemology. Kant's question is, in brief, What is *experience*, what does it involve, and how do we get knowledge by means of it? The point of view of the common consciousness and of Empiricism is that whatever is known by experience exists full-formed and complete before it is experienced, and that knowledge consists in the passive apprehension of this pre-existent world of objects. On the other hand, Kant insists that knowledge and therefore experience is possible through the co-operation of two faculties,—sense and understanding. Both are absolutely essential. Through *sense* the objects—the matter—of knowledge, are given; through *understanding* they are thought, formed, or understood, *i. e.*, become real objects of knowledge. As for Plato and Aristotle, so for Kant the "sensible" is, properly speaking, no "thing" at all, but capable of becoming something through the determining action of thought. Thus Kant attempts a reconciliation between Empiricism and Rationalism, admitting with the Empiricist that *sense* must furnish the *material* or empirical element of knowledge, while with the Rationalist he contends that the *understanding* must furnish its necessary and universal *form*. Not that by sense an object is given as a determined object, for all determination comes from the understanding. All that is meant is that the material, the chaos of sensations, is furnished by sense, to be determined through the *categories* of the understanding. Thus a knowledge of determined objects is gained through the joint operation of sense and understanding.

For Kant, therefore, the problem of philosophy resolves itself, first of all, into *a theory of knowledge*. The theory of knowledge developed in the *Critique of Pure Reason* is the necessary basis and real presupposition of the views regarding ethics and the philosophy of religion which are developed in the *Critique of Practical Reason* and the *Critique of Judgment*. For Kant, as was implied in the preceding paragraph, the peculiar *note* of experience is the *connectedness* of perceptions, or the reference of individual presentations of sense to the unity of the object or thing known. The essential fact in knowledge is synthesis. Every judgment of experience contains synthesis. This synthesis implies, according to Kant, four things: (1) a

manifold of sense which is combined; (2) the forms (space and time) in which this manifold is received; (3) the forms (the categories, whose supreme condition is the unity of apperception) under which the manifold so received is cognized; (4) the unity of consciousness itself (the 'static and permanent ego'). The 'static and permanent ego' is the presupposition of all connected experience. The mind is something more than a passive thing, a mere creature of environment. For Kant, accordingly (and this is how he meets Hume), the modes of synthesis by which the given manifold of sense is reduced to the unity of self-consciousness *are at the same time the modes of objective existence*. That is to say, self-consciousness is impossible apart from its object, apart from the orderly, systematic connection of phenomena which we call experience.

Starting provisionally from the ordinary dualism of thought and things, by a gradual transformation of the theory Kant arrived at the conclusion that the only way of accounting for the endless order of nature is that it is one which our own intelligence forges; that, instead of our passively receiving or apprehending objects (which the Empiricists had maintained as the sole condition of our ordered experience), it is rather, says Kant, by our intelligence alone that known objects are constituted. Our "experience" must forever remain unaccounted for and unexplained so long as we remain in the belief that *thought* and *nature*, the *rational* and the *sensible*, are abstract opposites. The point of view, then, which Kant would have us take is this, that the science of being and the science of knowledge are organically one and inseparable. The question whether Kant consistently maintained himself in this position will be referred to in a subsequent section.

On this basis the Kantian theory of knowledge would seem to imply that the relation between subject and object, mind and matter, is one of *organic identity*, and not of mechanical separation and opposition. The recognition that consciousness is a necessary element in all that is *for* it, and that *existence is existence for a self*, is at once the discovery that the object of knowledge is phenomenal, and at the same time it is the discovery of the noumenon of which it is the phenomenal: *consciousness*, in other words, *in the very act of being conscious*

transcends the dualism between itself and its object. Just here is to be found the starting-point of post-Kantian metaphysics,—a metaphysics based upon the generalization of the Kantian cognitive consciousness. For to admit with Kant that all existence is existence *for a self* is to admit a principle the complement of which became the fundamental doctrine of post-Kantian Idealism, namely, that all existence is the *manifestation of a self*,—that subject and object, spirit and nature, the self and the world, are not isolated, self-existent entities, but move and have their being in the persisting purpose of one immanent, absolute, spiritual life.

(*d*) Kant's *Ethical Theory.* For analysis and criticism of Kant's ethical theory see Bradley, *Ethical Studies* (iv); Caird, *The Critical Philosophy of Kant*, Vol. II; Dewey, *The Study of Ethics, A Syllabus*, sec. 36; Mackenzie, *Manual of Ethics;* Schurman, *Kantian Ethics and the Ethics of Evolution;* Sidgwick, *Methods of Ethics*, Book III. Note especially Kant's doctrine in relation to (1) the unconditional character of morality, (2) the autonomy of obligation, (3) antithesis of reason and feeling, of the 'noumenal' self, setting up the ideal of action and effort, and the 'phenomenal' self, made up of feelings and impulses which furnish the materials of volition—man as 'natural' and as 'intelligible' being, (4) freedom as an endowment rather than, as with Fichte, a spiritual achievement through development and work, (5) self-consciousness as the source of moral responsibility, (6) 'the good will,' (7) society as a 'kingdom of ends,' (8) the duties of self-preservation and self-development, (9) the law of reason as the fundamental law of nature, *i. e.*, the rational and spiritual principle revealed in human nature, the constitutive principle of the reality of the world as a whole.

(*e*) For our present purpose it will suffice to indicate in schematic form the more prominent results of Kant's inquiries: (1) The true critical method is the very opposite of that easy-going scepticism which regards a solution of the questionings of human reason as impossible. *Reason must be credited with the power to answer the questions to which it has itself given rise.* This *critical method* has permanent significance for the study of philosophy, art and literature, religion and human institutions. (2) Everything is derived from experience except the capacity

for experience. Herein lies the possibility of education and of the direction of personal development. (3) Personal experience, however, is not a stream of isolated sensations, but an organic unity, united by self-consciousness, and formally determined by the nature of the thinking subject. Each individual, by his own mental processes, builds up his own world of inner experience. (4) The individual is no mere knowing machine set in mechanical juxtaposition over against a world independent of intelligence: rather as an intelligent self he finds himself in the midst of an intelligible world, related and adapted to intelligence, bone of his bone, flesh of his flesh. For Kant objective consciousness becomes real only when it becomes subjective: self-consciousness, likewise, becomes real only when it finds an object through which it can realize itself. Thus the self and its object are equally the results of a process. Back of the distinction between the self and the object there is the experience process. The consciousness of the object and the consciousness of the self issue in their difference from a common source; and the consciousness of the object is an essential element in the consciousness of the self. Herein is Kant's interpretation of the place of nature (the objective world) in the evolution of intelligence. (5) In keeping with the results reached in his epistemological inquiry, in the ethical interpretation of experience, Kant finds the law for man's right action not in anything foreign or external to him but in man's innermost nature. This innermost essence of man is will. The fact of the existence of morality or duty is sufficient evidence for Kant that reason prescribes ends for itself. The realization of duty, moreover, would be impossible for a being who is not conceived of as free or capable of self-determination. In obedience to the moral law, *the fundamental fact in ethics and religion*, man finds proof of his freedom and of his membership in a moral order of the world. Thus for Kant personality is central,—personality not in isolation as with Rousseau, but in a society of moral beings united by the law of duty. The end of life is not happiness but work in the service of humanity. (6) Intellectual development, because of its evident limitations in relation to the deeper needs of the spiritual life, is less directly significant than the cultivation of the feeling of reverence for the moral law and of a never-

ending aspiration towards its realization. The moral law is the central truth in Kant's world and is for him the essential element in human education.

6. (*a*) Goethe (1749–1832), and Schiller (1759–1805), together with Kant, the heroic figures in German culture—Reasons for not including the work of Goethe and Schiller in the Romantic Movement—Goethe's individuality—His lyrical poetry a sincere expression of his inner life and a faithful reflection of his intellectual and moral development—Influence of Rousseau, Lessing, Herder and Schiller—The *romantic* and the *classical* influences—His works as "fragments of a great confession"—*Faust* as autobiographical—The adjustment of the individual and collective ideals in Goethe's life and writings—Goethe as the apostle of self-culture—Arnold's judgment of Goethe, "the greatest poet of modern times . . . because he was by far our greatest modern man," compared with Richard Holt Hutton's, "Goethe was the wisest man of modern days, who ever lacked the wisdom of a child; the deepest who never knew what it was to kneel in the dust with bowed head and a broken heart." —"I find a provision," says Emerson, "in the constitution of the world, for the writer or secretary, who is to report the doings of the miraculous spirit of life that everywhere throbs and works. His office is a reception of the facts into the mind, and then a selection of the eminent and characteristic experiences."

(*b*) Schiller—"A hundred years may roll away, another and yet another, still from century to century his name shall be celebrated, and at last there shall come a festival when men will say: See! There was a truth in his ideal anticipations of freedom and civilization"—Three stages in Schiller's development, (1) eudæmonism, (2) pessimism, (3) altruism. In the two earlier stages Schiller was under the influence of Rousseau (see *The Robbers*, a protest against the social and political forces of the time; also *Ode to Rousseau*, the six poems addressed to Laura, and *Resignation*)—Influence of Goethe and Kant—Opposition to Romanticism—Bias for historical subjects—"His ever-aspiring genius"—The poem *The Ideal* an embodiment of Schiller's philosophical and artistic creed.

(*c*) In the present outline only three of Goethe's works are considered,—*Faust*, *Wilhelm Meister*, *The Elective Affinities*. The

spiritual, *i. e.*, educational, significance of these are indicated more fully in Chapter VI. For the present, attention may be called to several points to be noted: (1) The true significance and ethical import of *Faust* can be realized only when the two parts are regarded as integral elements of one organic whole; (2) The tendency to symbolism; (3) Goethe's conception of nature; (4) Religious mysticism; (5) The thirst for truth a divine impulse; "Ye shall not prevail"; (6) The fatalism of passion; (7) The *community* of human life; (8) The possibility of moral restoration. In these three works Goethe treats the problem of the individual. *Faust* is a glorification of individual culture consecrated to the service of humanity. *Wilhelm Meister* is a record of the incidents in the development of a soul from immaturity to a conscious recognition of a world order. *The Elective Affinities* deals with the conflict between human instinct and the moral order of the world. Over against the destructive work of Rousseau, by which Goethe was so strongly influenced in his youth, stands the second part of *Faust* as a "triumphal song of civilization." Over against the *Émile*, with its glorification of education through isolation, is set the *Wilhelm Meister*, in which every individual is called upon to cultivate himself in order that he may enter (indeed, *only through entering*) into his heritage of the wisdom of the race. "*Wilhelm Meister*," writes Dr. Harris, "*utters the watchword of this epoch in which we find ourselves.*"

(*d*) Schiller's early ethical ideas betray the influence of Rousseau. Soon through the study of Greek art and life the Rousseau idea of an unrestrained life according to nature gave place to the conception of an harmonious, self-determined development of the personal life. Later Schiller came under the influence of Kant, whose insistence upon the supremacy of the ideal over natural instincts made a lasting impression upon him. "The deep, fundamental ideas of the idealistic philosophy," so he wrote, "are an abiding treasure." He was now forced, however, to seek an adjustment of his ethical and his æsthetic creed. Schiller develops his ideas in close relation to the problem of culture in his *Letters on the Aesthetic Education of Man* (1795)—a development of the fundamental idea of the poem *Die Künstler*. Antagonism between the moral and the sensuous is a sign of imperfect culture. Only through æsthetic

education can the problem be solved. This perfect adjustment will one day be attained in play,—in which man is truly man, self-active, self-determined, obedient to law, the sensuous nature not suppressed. Thus for Schiller artistic activity or the play impulse mediates between the sensuous impulse and the rational element in the cultured man, uniting the two in harmonious co-operation. Neither lust nor moral worth won through obedience to the stern law of duty is beautiful. Beauty and grace are not won through the triumph of one, nor in the suppression of the other. The perfect woman and children reveal the perfection, the original destiny of man. "Deep meaning oft lies hid in childish play." (In addition to the *Letters on Aesthetic Education*, see also, *Die vier Weltalter, Der Pilgrim, Das Ideal und das Leben, Das Mädchen aus der Fremde, Der spielende Knabe, Das Eleusische Fest, Lied von der Glocke.* Francke's interpretation of the spiritual significance of Schiller's ideals as embodied in his five great historical dramas should be noted.)

References:

In addition to the works of the writers mentioned, the following general references may be added: (1) Lessing and Herder: Erdmann, *History of Philosophy;* Francke, *German Literature as Determined by Social Forces;* Höffding, *History of Modern Philosophy*, Vol. II; Nevison, *Herder and his Times;* Rolleston, *Life of Lessing* (with bibliography); Scherer, *History of German Literature;* Sime, *Life and Writings of Lessing;* Taylor, *Studies in German Literature;* Windelband, *History of Philosophy.* (2) Kant: In addition to various histories of modern philosophy, the treatises of Adamson, Caird, Kuno Fischer, Paulsen, Wallace and Watson may be consulted. (3) Goethe and Schiller: Blackie, *The Wisdom of Goethe;* Boyesen, *Goethe and Schiller;* Carlyle, *Critical and Miscellaneous Essays;* Davidson, *Philosophy of Faust;* Dowden, *New Studies in Literature; English Goethe Society Publications;* Fischer, *Schiller-Schriften;* Francke, *German Literature;* Harris, *The Lesson of Goethe's Faust;* Hillebrand, *German Thought;* Lewes, *Life of Goethe;* Nevison, *Life of Schiller* (with bibliography); Scherer, *History of German Literature;* Seeley, *Goethe Reviewed after Sixty Years;* Sime, *Life of Goethe* (with bibliography); Snider, *Commentary on Faust;* Taylor, *Studies in German Literature;* Thomas *Life and Works of Friedrich Schiller;* Ueberweg, *Schiller als Historiker und Philosoph.*

Further problems for study:

1. Lessing's reconciliation of *freedom* and *discipline.*
2. Lessing's principles of æsthetic criticism.
3. Influence of (a) Lessing on Herder, (b) Lessing and Herder on Goethe.
4. Comparison of Lessing's *Education of the Human Race* and Temple's *Education of the World* (in *Essays and Reviews*).
5. Kant's conception of a 'person.'
6. The autonomous nature of obligation in the Kantian Ethics.
7. The individual and social elements in Kant's ethical theory.
8. The development of psychological theory from Rousseau to Kant.
9. Goethe's conception of nature.
10. Goethe's ideal of culture as illustrated in *Faust* and *Wilhelm Meister.*
11. Schiller's conception of *æsthetic* education.
12. Schiller's theory of play.

IV

ROMANTICISM

1. In the present section *Romanticism* is used to cover a twofold movement: (1) an expansion of the *revolutionary individualism* and *naturalism*, which may be said to have had its beginnings in Rousseau, (2) a reactionary and reconstructive movement towards a *collectivistic* ideal of life,—an ideal which, from the philosophical point of view, found its most organic expression in the work of Hegel. The development of Romanticism—as designating a particular period of time—may thus be said to extend from the emergence of Rousseau in 1749 to the death of Hegel in 1831. These dates will serve our present purpose as convenient marks of identification. The second of the tendencies noted above was not wholly subsequent to the first; it was, perhaps, in large measure. Frequently, however, the two tendencies are to be found side by side in the writings of the single author.

2. As is implied in the preceding section, Romanticism, in the course of its evolution, was intimately related to and influenced by the individualistic naturalism of Rousseau and the idealistic movement begun by Kant, more fully developed by Fichte and Schelling, and carried to its completion by Hegel.

Rousseau's *naturalism* and *individualism* embodied for the men of his generation the conviction (1) of the worth and rights of man as man and (2) of the ministry of nature to the human spirit. This first element of Romanticism, its tendency to naturalistic individualism, coming in contact with the idealistic movement with its organic modes of thought, was modified and transformed in, at least, a threefold manner,—in its relation to (1) man, (2) nature, (3) the Absolute. In place of the atomism of an earlier day there was evolved a conception according to which the self and the world, civilization and nature, the divine and the human, became parts of one organic spiritual life or process.

3. The individualistic and naturalistic aspect of Romanticism is evidenced by (1) the reaction against social and political authority, the hatred of tyranny of whatever kind, the dualism of nature and culture; (2) a high development of imaginative sensibility, frequently bordering on sentimentalism; (3) an exaltation of feeling as fundamental and supreme, to be recognized in the conviction that intuition should supply the deficiencies of reason, that religion is based on feeling, that impulse and 'natural instincts' are the surest guides to truly artistic action; in the lyrical and personal note of literature; in the 'storm and stress' mood, with its melancholy, its exaggerated self-consciousness, its frequent tendency towards the morbid; (4) a melancholy love of nature, opposing nature to man; preferring the solitary, the wild, the terrible, the mysterious; idealizing the simple, unconventional ways of childhood; (5) a revolt against classical traditions and methods, demanding and suggesting joy in emotion, in color, sound, movement, the sense of freedom, rather than in classical precision of thought or form; (6) a passionate aspiration, finding expressing in the assurance of something nobler and truer than the present; in the desire for a free and harmonious development of human nature; in a vague nature-worship, a mystical pantheism, a yearning, human tenderness, a longing for intellectual excitement, and the desire to penetrate the unknown and the unseen, for beauty haunted by strangeness and mystery; in a passion for the past,—the romantic past of myth, of legend, of chivalry.

4. This individualistic phase of Romanticism, with its as-

sertion of the rights of man, its revolt against the traditional and conventional; its exaltation of feeling as supreme, its development of imaginative sensibility, its self-consciousness, its egotism, its melancholy; its contempt for the present, its passion for the past, its renascence of wonder, of mystery, of chivalry; its universalism rather than its nationalism; its passionate conviction of the possible harmonies between the truly natural man and the life of nature, of the beauty of childhood, and the dignity of the solitary peasant; its nature-worship and its pantheism; its belief in a nobler and better form of life somewhere beyond this present real,—all these tended to carry it beyond itself to a more spiritual and idealistic point of view,—to a view of the world and life, indeed, which made Romanticism complementary to Idealism in initiating much that is best in the intellectual and spiritual life of the present. Certain of the more important factors making for what was spoken of in a preceding section as the tendency in Romanticism towards a collectivistic ideal of life may be briefly noted: (1) The gradual prevalence of organic over mechanical modes of thought. (Compare, *e.g.*, Herder's conception of the relation of nature to man; Kant's doctrine of experience as an organic unity with reason as its constituent factor, leading to an idealism which finds in the manifold forms of human self-expression the manifestation of free, spiritual life and purpose; Fichte's doctrine of the will as fundamental, and the medium of its realization, the common life of man; Goethe's belief in the divine immanence in nature and humanity; Schleiermacher's conception of the individual in organic relation to the world; Hegel's conception of human institutions as forming one vast spiritual organism whose ultimate goal is the realization of the kingdom of God.) (2) The resultant reconstruction of the doctrine of personality. The freedom and the realization of the individual were no longer conceived of as the unhindered expression of natural instinct, but as spiritual achievements, won through self-limitation in the presence of ideal ends. (3) As a result of the return to nature in literature and life, the prevalence of the organic mode of thought, the deepening of imaginative sensibility, not only did man draw near to nature, but nature was brought into a more living unity with the human spirit, and to

man was disclosed nature, not as a mere alien something, an unknown thing-in-itself, but that in which intelligence finds its object, a reflection of its own activity, a medium through which human activities reveal themselves, a source of beauty and delight, a ministry to spiritual needs. (4) As a further resultant of the organic mode of thought meeting with the Romantic *passion for the past*, its wistful yearning for the days gone by, coupled with its demand for closer vision and clearer knowledge, the past was brought into more vital relation to the present, and this in turn gave rise to an appreciation of the *continuity* of phenomena in science, in æsthetics and literature, in politics, in history, philosophy and theology. (Concerning the position of evolutionary theory during this period, see Osborne, *From the Greeks to Darwin;* Royce, *The Spirit of Modern Philosophy*, chap. ix; Sully, art. *Evolution* in *Encyclopædia Britannica*.) (5) The increasing fear of the tyranny of mere "reason," the reaction due to the social and political crisis in German life, had not only excited the feeling of nationality, but had quickened it into a passion, especially in such minds as Fichte, Schiller, Schleiermacher, Arndt, Körner and Uhland. The work of these in turn had its foundations in those ideals of life and duty enforced by Lessing, Herder, Kant and Goethe. (6) The liberating influence in the spiritual life of Germany of the study of Greek literature and art; of Shakespeare and Milton. (7) Along with the organic mode of thought there came as one of its manifestations a new conception of the divine immanence in the world, compelling "all new successions to the forms they wear," investing all things in nature, in art, in life, with a sense of the infinite, the unfathomable, the wonderful, yet ever with the possibility of familiar comradeship between them and the human soul. "I can no longer," said Lessing, "be satisfied with the conception of a God out of the world," and Goethe:

> "Whom I own for Father, God, Creator,
> Holds nature in himself, himself in nature,
> And in his kindly arms embraced, the whole
> Doth live and move by his pervading soul."

5. The more prominent members of what is strictly known as the 'Romantic School' were August Schlegel (1767–1845), and

his brother, Friedrich Schlegel (1772–1829), who by their critical writings did much to strengthen the Romantic tendency; Ludwig Tieck (1773–1853), the dramatist and man of letters; Novalis (1772–1801), and Schelling (1765–1854), its typical philosophers; Schleiermacher (1768–1834), the philosophic theologian of the movement. Friedrich Schlegel held that "the French Revolution, Fichte's *Wissenschaftslehre*, and Goethe's *Wilhelm Meister* are the greatest tendencies of the age. The man who takes offence at this juxtaposition, to whom no Revolution can appear great which is not noisy and material, has not yet risen to the high and wide standpoint of the history of man." (For an account of *Romanticism* in its critical and literary aspects especially, but still as influencing philosophic speculation profoundly, see Francke, *German Literature;* Omond, *The Romantic Triumph;* Scherer, *German Literature;* also, Haym, *Die romantische Schule;* Hettner, *Die romantische Schule;* Schmidt, *Geschichte der Romantik;* also, *Geschichte der deutschen Litteratur seit Lessings Tod.*)

6. In the study of the philosophy of Romanticism the genesis of the romantic *Weltanschauung* may be discovered in (1) a certain dissatisfaction, felt by Fichte, Schelling, and others who were fundamentally followers of Kant, with the Kantian view of experience as a whole. Through the Kantian *analysis*, it was believed, the living unity of the spiritual life had not been preserved. On the other hand, the deepest element in the Kantian system was the thought of synthesis, of self-activity as the essence of spirit. The question was asked, most persuasively by Fichte, Should not this fundamental element, the spontaneity, the synthetic activity of spirit, be made the point of departure in philosophical construction? Would not atomism, isolation, externality disappear, if all things in the world of nature (Schelling) and in the life of man (Fichte) could be shown as manifestations of one Life or Spirit operative in them? (2) The revival of the study of Spinoza, Leibnitz, Bruno, Böhme, who inspired such as Herder, Goethe, Schelling, Schleiermacher and Novalis with an enthusiasm for nature and the world conceived as an organic whole. (3) The belief that truth is revealed not in reason alone, but in the feelings and intuitions of the human soul. (4) The development of the sciences and the growth of

the idea of the unity of nature. [Important names are Lavoisier (1743–1794), Humboldt (1769–1859), Goethe (1749–1832)]. (5) The new conception of history. (6) The development of a new content in the religious consciousness. (7) The growth of a new and more spiritual type of art criticism and interpretation. (8) The growing disinclination clearly to distinguish between æsthetic, philosophic and religious ideas. Novalis, for example, declared that the separation between poetry and philosophy is superficial and ingenious.

7. For Schelling's relation to Fichte and Hegel, see Chapter V. In a study of his relation to Romanticism, note: (1) His work a *spirit*—an outcome of poetical intuition; a *tendency of thought* rather than a system. (2) Nature not, as for Fichte, a mere abstract limit to the infinite striving of spirit, but the manifestation of one formative energy or soul. Nature and spirit complementary parts of a unitary process. "The system of nature is at the same time the system of our spirit. Nature is visible spirit; spirit is invisible nature." (3) His attempt at the reconciliation of opposites or differences within nature and mind. As in nature are exhibited the dynamic stages or processes in the struggle of spirit towards consciousness, so in the world of mind are disclosed the manifold stages through which self-consciousness, with its opposites and reconciliations, struggles towards its ideals. (4) His symbolism, and his application of organic conceptions to the various levels of existence. [Compare, also, the work of his disciples: Carus (1789–1869), Oersted (1777–1851), Oken (1779–1851), Steffens (1773–1845).]

8. (a) In the study of the work of Schleiermacher there should be noted: (1) Its union of critical reflection, appreciation of historical method, philosophic breadth, moral intensity, and devotional spirit. (2) Its adherence, for the most part, to the general world-view of Romanticism, which attempts to grasp in one homogeneous form the entire content of life. (3) Its theory that philosophy finds the best guarantee of its truth in the religious conviction it engenders. (4) The idea of God, as the unity of thought and being, underlying human knowledge as its presupposition. (5) Its conviction that the innermost life of man must be lived in feeling, and that this, and this alone can bring man into immediate relation to the Highest. Religion

consists in the *immediate* consciousness that all finite things exist in and through the infinite: all things temporal in and through the eternal. (6) Since religion is conceived as that which affords the highest point of view, ("giving to life its music") or rather as the fundamental mode of our participation in the spiritual life, it follows that intellectual, moral and æsthetic culture can attain their perfection only when they lead back to living in the immediate feeling of the infinite as that which surrounds and supports all finite individualities, all finite existence. It is not to be understood that this religious feeling is purely passive, or *æsthetic* religiousness: rather its true form is *teleological* religiousness whose highest form is labor for the advancement of the kingdom of God. (7) Its emphasis on the positive significance of the individual. Each man should express humanity in his own way and with a unique blending of its elements.

(b) Schleiermacher's *theory of nature and ethics:* (1) Schleiermacher recognizes, first of all, an antithesis between the real and ideal, organism and intelligence, nature and reason. The opposition is, however, not absolute, since in life both elements are united. Underlying nature is universal reason as organizing principle. Attaining to consciousness in man Reason finds itself partly in conflict, partly in harmony with nature. There is always a relative harmony. The end and aim of human thought and activity is to lessen the extent of this opposition between man and the world. Consciousness itself, with its union of antithetic elements, is proof that the reconciliation is not hopeless. Back of nature and mind is a unity, a life, the common ground of nature and humanity, the principle of knowledge, the presupposition of the ethical life of man, a life whose best witness is the religious consciousness. (2) Starting with the (apparent) dualism of ego and non-ego, Schleiermacher conceives the life of man to consist in their interaction, its infinite goal, their interpenetration. The ego is body and soul in one. The *organization* of the self has its rational aspect: the *reason*, its organic element. Every extension of consciousness is higher life: individuality increases through increasing participation in the life of nature and humanity. The metaphysical basis of the ethical life was noted above, namely, the ultimate unity of

nature and reason; its psychological basis is found in the impulse of reason to organize nature—the human body as well as outer nature—as the instrument of its purposes. Thus ethical development stands to nature in the relation of reciprocal action. The ethical process is twofold: (i) an organizing principle, through which man attempts to make himself *master of nature*, (ii) a symbolizing activity through which he seeks *to give expression to his spiritual life*. Thus for Schleiermacher the entire development of human culture is a part of the ethical development of man. The *organizing* activity produces the forms of property and of human intercourse: the *symbolizing* activity gives rise to the poetic and artistic expressions of feeling, and the manifold forms of science: the united products constitute the triumphs or achievements of humanity as reason, in a word, civilization, and thus *spiritual intercourse and the social conditions of moral action*. The individual, *as an individualization of universal reason*, attains moral worth according as he positively manifests in a distinct and peculiar way common human nature. This unique expression, this fulfilment of the moral function, is not, however, produced in isolation, but only through participation in the various forms of the ethical life,—the home, the school, society, the state, and the church. These are the instruments or organs which Reason has found to minister most efficiently to the higher life of man. The individual *makes his moral problem* in the *actual relationships of society*. But "without love, there is no culture." "In virtue of his [Schleiermacher's], fine understanding of Nature," says Höffding, "and of the conditions of personal life he takes his place as one of the leading spirits in the Romanticist circle."

References:

In addition to the works of the authors and references cited in the section, and the various histories of philosophy, see Bosanquet, *A History of Æsthetic;* Brandes, *The Romantic Movement in Germany;* Coar, *Studies in German Literature in the Nineteenth Century;* Francke, *History of German Literature;* Omond, *The Romantic Triumph;* Pfleiderer, *Development of Theology since Kant;* Royce, *The Spirit of Modern Philosophy;* Watson, *Schelling's Transcendental Idealism;* Wundt, *Ethical Systems.*

Further problems for study:

1. Goethe's relation to Romanticism.
2. The *Romantic* element in the philosophy of Fichte.
3. Schelling's interpretation of nature.
4. Contributions of Romanticism to ethical theory.
5. The relation of Romanticism to the Naturalism of Rousseau.
6. Novalis.
7. Schleiermacher's concepion of *individuality.*
8. The individual and social tendencies in the Romantic movement.

V

FROM KANT TO HEGEL: THE IDEALISTIC INTERPRETATION OF NATURE AND HISTORY

1. The progress of philosophy consists not so much in stages of discovery as in a gradual process of absorption of earlier problems into problems more complex and more inclusive. The wonderful vitality of the philosophic movement dominated by Fichte, Schelling and Hegel was due to three causes: (1) the legacy of the *Critical* philosophy, (2) a favorable environment, (3) the constructive insight of these three leaders. Although it seems just to maintain that the legitimate outcome of Kant's theory of knowledge is that outlined in Chapter III, sec. 5, yet Kant was never entirely able to maintain himself in this position. A dualistic and mechanical view of knowledge still haunts his system: indeed, in several places, notably in his *Refutation of Idealism*, inserted in the second edition of the *Critique*, he advances arguments amounting to a flat denial of Idealism, in making which he strangely enough gives up his own position, namely, the organic relation of subject and object. To overthrow the assumption of the independent existence of subject and object, of mind and nature, constitutes the peculiar problem of Fichte and Hegel from the epistemological point of view. No one, of course, will deny that sensations are due to the action of objects on the organism. Fichte and Hegel maintain that on Kant's own showing these *objects* are themselves determined by intelligence. Neither as object of knowledge, nor as existence, therefore, are subject and object unrelated to each other: the subject has no nature of its own independently

of the object, nor the object independently of the subject. The assumption of the independent existence of subject and object is very natural for the reason that, when we begin to explain knowledge, we already have knowledge. But in accounting for the origin of knowledge we have no right to start from the independent existence of subject and object unless it can be shown that such independent existence of subject and object can be known. When Kant asks, therefore, "By what means should our activity of knowledge be aroused into activity but by objects?" he neglects the significance of his own position, namely, that neither object nor subject exists for knowledge *prior to knowledge*, and that to ask how the subject should be aroused to activity by the object is to ask how a non-existent object should act upon a non-existent subject. In seeking for an answer to the question, What is contributed by the subject and, What comes from the object? the previous question must be answered, Is any such separation of subject and object permissible? If there is no known subject which does not imply a known object, if, in other words, both subject and object are the result of a unitary process of experience, it follows that the element belonging to the one cannot be separated from the element belonging to the other.

Here, then, we find the essential contribution of the post-Kantian epistemology. Kant, though apparently starting from the opposition of subject and object, pointed the way to the overthrow of this position. He, however, could never wholly get away from the position that while the *known* object does not exist apart from the subject, the *real* object does so exist. Fichte and Hegel, on the contrary, would remove the inconsistency by insisting upon the logical implication of the position that for knowledge the object is not an independent existence but *one in and for a conscious subject*. If for knowledge the self and the world, spirit and nature, exist for each other, then *as existences* they are not independent of each other. For, since spatial and temporal relations, and the categories which determine objectivity have a meaning only within knowledge or experience, it follows that they can no more belong to the subject than to the object, but only to the subject in so far as there has arisen for it the consciousness of an object determinable

under these relations. The object has no existence for the subject except as the subject distinguishes it from and yet relates it to itself. Whatever the object is, it is for a subject, and *any other object is a fiction of abstraction.* If this be granted, it follows that there can be no opposition between the *matter* and the *form* of knowledge: no opposition, *i.e.*, between a *matter* which comes from the object, and a *form* contributed by the subject. This is, in brief, the contention of Fichte and Hegel in their attempt to remove the contradiction in the epistemology of Kant. In other words, for them, the science of knowing and the science of being are organically one and inseparable.

2. The investigation of Kant resulted in the discovery of the self, or ego, as the supreme condition of our intellectual and moral experience. Starting from this principle of unity Fichte (1762–1814), followed by Schelling, made it, as absolute, their metaphysical principle. For Fichte, as for Hegel, philosophy means the systematic development of thought from its most abstract phase to the wealth and fulness of real existence. His task, as he conceived it, was to bring into organic connection the *disjecta membra* of the Kantian system. The connection between mind and nature, suggested by Kant, pointed *to a common root of both, an organic unity with many antitheses:* that the objective universe of nature and history, in that it is intelligible, is the working of an immanent Reason to which man's consciousness is akin. Fichte's problem was ever the determination of the relation between reason as practical and reason as cognitive. This idealism, begun by Kant and Fichte, and carried to its fuller completion by Schelling and Hegel, was destined to raise the modern mind to a higher consciousness, blending as it did "the realism of the ancient world and the inwardness and ideality of the Christian religion."

3. A brief outline summary of the more important features in Fichte's teaching may be given as follows:

(a) *Theory of knowledge:* (1) The task of philosophy is the explanation of experience. Within experience we find 'ideas of things.' With *dogmatism* we may deduce the idea from the thing, or, with *idealism*, the thing from the idea. The individual's world-conception (for the acceptance of either method involves

such a conception) thus depends on what kind of man he is. (2) By the 'thing-in-itself' Kant meant to assert nothing more than the unity and absolute objectivity which the mind gives in perception to its own creations. In experience object and subject imply each other. The term *object* does not, indeed cannot, take us beyond the limits of the mind. (3) A science of knowledge (the *science of sciences*) must be based upon one single fundamental principle, one which cannot be proved; otherwise it would be worthless as the starting-point of a system. The only absolute proof of such a principle or hypothesis is to be found in what it will do for us, and "*everything depends upon the attempt.*" Our first inquiry, then, is for the unconditioned fundamental principle which is to express that *deed-act*—the activity not occurring among the empirical determinations of our consciousness (since it is impossible so to occur), for the reason that it is the basis of all consciousness and first and alone makes consciousness possible. (4) In interrogating consciousness we find an *ego*, and a *non-ego;* but the latter is *found only in virtue of the spiritual activity of the ego or self.* Our first principle is, therefore, "the ego posits itself," and the second, "the ego posits a non-ego." Through the method of antithetical connection a third principle emerges "the ego posits a *limited ego* in opposition to a *limited non-ego.*" It is not of course to be supposed that Fichte held that *the special content of experience might be deduced from general principles.* If we forget this "in our endeavor to explain the whole of life, we shall lose life itself" (see, *On the Nature of a Scholar*). For Fichte, then, the fundamental principle of a theory of knowledge is "there is nothing in the ego which is not the product of the ego's own activity"; everything in consciousness is due to a unitary, spiritual activity, a conception based on the essential inwardness and validity of the spiritual life. Ultimately all reality must be referred to self-consciousness. Man's innermost essence is in willing and working. All our presentations are conditioned by our will. Being is life, inner, active life. (5) To the question, "Why does the ego posit a non-ego within itself?" no answer can be given from the theoretical point of view. Apart from the demands of our moral consciousness it remains inexplicable. In the moral consciousness alone is the true

significance of self-activity, the world of nature and of humanity disclosed.

(*b*) *Theory of Ethics:* (1) As in the sphere of cognition, so in that of practice, the conception of the original activity of the self is fundamental. The moral consciousness reveals effort, struggle, aspiration towards ideal ends, as the supreme good. Activity, struggle, aspiration presuppose limitation, resistance. There would be no moral life without a system of limits, of objects to encounter, of resistances to overcome. No activity, no world: no world to overcome, no self-realization! Nature is the material of duty. (2) Activity at first directed through instinct upon objects becomes for a time dependent upon them. The activity, being infinite and therefore unsatisfied with finite objects, quickens reflection and reflection liberates the activity. Thus is freedom possible. Natural wants may thus become instrumental to the attainment of freedom. Thus in the ethical law, "Every particular action should form part of a series which leads the individual to complete spiritual freedom," are reason and sense adjusted. (3) In that the essential fact in morality consists in the submission of the will to the moral law, Fichte thinks of being as the moral nature forced to build itself a *natural order* in which it may yield obedience to the moral law, and to become self-separative in *a community of ethical individualities, through whom the moral virtues may be realized.* Thus the existence of other egos and of a world in which these egos may act is "the necessary condition of a consciousness of freedom." The outer world, then, the not-self, is just as large as the individual's spiritual activity makes it.

(*c*) The Absolute for Fichte is the moral consciousness universalized and conceived as absolute moral activity from which originate nature and society. Fichte's significance consists in the recognition of rational self-activity as the basis of a conception of the world, of the validity and supremacy of the inner, spiritual life. Where he fails is in his neglect to attempt an explanation of the relation between his 'schema' of spiritual evolution and the historical and the actual evolution of nature and humanity. For his neglect of the riches of intelligence as disclosed in the development of nature and history, Fichte's thought has been accused of being purely subjective idealism—

a charge not wholly without foundation. Support from experience to the essential principle of his idealism was to be brought from nature by Schelling, from history by Hegel. (See also, Royce, *The Spirit of Modern Philosophy*, pp. 152–153.)

4. Though strongly influenced by the Fichtean idealism, Schelling's permanent tendency was to give to the method of Fichte a more objective application and to unite with it the more realistic view of existence gained from his study of Spinoza. With the Romanticists generally, Schelling felt that Fichte had endangered the reality of the world of nature by conceiving it as merely an abstract limit to the infinite striving of spirit. Nature rather is a unity, a manifold for ordinary perception, but for reason not merely stuff for thought but a unity, the manifestation of one formative energy, the radiance of a divine manifestation. It is a realization of spirit: its outward forms are not imposed from without, but the outcome of an inner teleology. It is self-forming, the outcome of the same spirit, though unconscious, of which we are aware in self-consciousness. Nature and spirit are complementary parts of a unitary process. Schelling, accordingly, attempted to supplement Fichte by exhibiting nature as an intelligible system, as a function or process of intelligence towards self-consciousness as its necessary goal, *i.e.*, to show its essential oneness with the ego as intelligent, and not, as Descartes had done, as the "dead antithesis of conscious thought." Having as the animating principle of his thought (for him the inner type, indeed, of all things) the notion of the *reconciliation of opposites or differences*, in his attempt to adjust the changes of nature with the conception of unity in productive force, Schelling reaches the notion of duality, or polar opposition through which nature manifests itself in a dynamical series of changes—matter, light, and organism. And just as in nature through these processes the spirit struggles to consciousness (compare the theory of Leibnitz), so in the world of mind are disclosed the stages through which self-consciousness with its inevitable antagonisms and reconciliations struggles towards ideal forms. Nature is no alien power: *the object* is *intelligible because it is of like essence with the subject.* Nature is spirit manifest. Schelling's inquiry, therefore, is directed towards a comprehension of the unity of the world under the *one principle*

of organic development. One further point should be mentioned. Schelling had come to see that nature and personality are not two things, but are correlatives rather. In the *Identity Philosophy*, however, in his explication of this position, he returned to the position of Spinoza, in which subject and object, mind and nature, are regarded as parallel developments of equal importance and value. All difference is merged in absolute oneness. He finds nothing in spirit but what he had found in nature. In this admission, it would appear that Schelling eliminated the real import of the idealistic principle as fundamental to the thought of Kant, Fichte, and Hegel. (See further brief notes on this point in *Hegel's Doctrine of the Will*, pp. 26–27, 30–31, 34–41.)

5. The problem of Hegel (1770–1831) is still the problem of Kant and Fichte, namely, What does experience involve, and what is the intimate nature of the consciousness which that experience presupposes? All three were in essential agreement in maintaining that the fundamental error of the older philosophy had been the doctrine of the independent existence of the world without and the world within, and that only in the recognition of their organic unity can any explanation of their relations one to the other be offered. The true nature of this principle of organic unity is disclosed in self-consciousness. The implications of this position had been only imperfectly grasped by Kant and Fichte. Schelling, though beginning well, had ended with Spinozism. Hegel, too, recognized that self-consciousness is the unity to which every manifold must be referred. But he was the first to show in systematic form, through an exhibition of the categories as antithetical yet 'interlocked moments' in the very nature of the self, that self-consciousness is founded upon difference; that consciousness is a 'many-in-one,'—an organic whole in which the opposition between the self and the external world is overcome. (For a more adequate statement than could justly be given in a brief outline of Hegel's interpretation of nature and history, especially the latter, on the basis of this theory of self-consciousness, see any one of the following works: Caird, *Hegel;* Harris, *The Logic of Hegel;* Wallace, art. *Hegel* in *Encyclopædia Britannica.* For an account of Hegel's *theory of ethics* and of *the ethical development from*

Kant to Hegel, see *Hegel's Doctrine of the Will*.) In the study of the ethical significance of Hegel's work the following points at least should be noted: (1) The three aspects or stages of every truth or reality, thesis, antithesis, synthesis. (2) Consciousness as an indissoluble unity of opposites. (3) The Absolute as spiritual. (4) The world of nature and humanity a process of development, a manifestation of the Absolute. (5) The notion of moral progress by antagonism. The consciousness of self implies a consciousness of not-self, and grows with it and by means of it. Its progress is thus one of self-determination and self-realization through environment—the environment of an intellectual and moral world.

In his *Logic of Hegel* Dr. Harris says that the test of any system of philosophy is the account it gives of the institutions of civilization. "What does it see in human history and the institutions of the family, civil society, the state, the church?" It is in Hegel's attempt to answer this question, to trace in the manifold forms of institutional life the element of rationality and of spiritual significance, and to indicate how the culture and perfecting of the individual life is not attained by the one whose life is lived in accordance with *mere* nature, nor by him who "cares but to pass into the silent life," but by the one who sees treasured up in the various relations of concrete social life,—the family, the community, the state, the church,—the spiritual experience of the human race, and who, supported by this insight, is living a shared life along the beaten highways of this common world. Not elsewhere, according to Hegel, is the way which leads to the everlasting life.

References:

Besides the works of Fichte and Hegel (especially Fichte's *Science of Rights*, and Hegel's *Philosophy of Right* and *Philosophy of History*) and the various histories of philosophy, the following interpretations may be consulted on particular points: Adamson, *Fichte*, also, *Lectures on Modern Philosophy;* Baillie, *The Origin and Significance of Hegel's Logic;* Bosanquet, *Philosophical Theory of the State;* Caird (E.), *Hegel;* Caird (J.), *The Philosophy of Religion;* Everett, *Fichte's Science of Knowledge;* Harris, *Logic of Hegel;* Hibben, *The Logic of Hegel;* Jodl, *Geschichte der Ethik in der neuren Philosophie;* McTaggart, *Studies in the Hegelian Dialectic*, also, *Studies in the Hegelian Cosmology;* Seth, *From Kant to Hegel*, also, *Hegelianism and Personality;* Stirling, *Secret of Hegel;* Wallace, *Lectures and Essays on Natural Theology and Ethics*, *Prolegomena to the Logic of Hegel*, also *Hegel's Philosophy of Mind* (*Introductory Essays*).

Further problems for study:

1. Fichte's conception of individuality.
2. The significance for educational theory of Fichte's doctrine of self-activity.
3. Fichte's conception of institutions.
4. The development of the conception of the 'antithetical method' in Kant, Fichte, Schelling, and Hegel.
5. Hegel's doctrine of freedom.
6. Hegel's conception of the state.
7. Hegel's conception of the parallelism between the development of the individual and the evolution of the race.

VI

FROM ROUSSEAU TO FROEBEL; THE EVOLUTION OF EDUCATIONAL IDEAS

1. In a study of the evolution of educational ideas from Rousseau to Froebel it is necessary to keep in mind the intimate but complex intellectual relations of the three great movements of the period, outlined, with a view to their educational significance chiefly, in the preceding sections, namely, (1) the *revolutionary naturalism* of Rousseau, (2) *romanticism*, (3) the *transcendental development* in philosophy from Kant to Hegel. All three movements center ultimately about the question, *What is the right life of the soul?* Without any attempt at completeness of statement and without being oblivious of their evident shortcomings, the more important elements of the ethical and cultural significance in these three movements may be noted:

(*a*) Naturalism: (1) In asserting the innate goodness of human nature, the natural impulse of man towards perfection, the ideal simplicity of nature against the existing conventionalisms, forced the recognition of the essential *humanity of the individual* as opposed to the artificial products of culture and society. (2) In opposing nature to man, it awakened a passionate love of natural scenery, and an interest in the liberty and spontaneity of childhood. (3) In maintaining that the natural man is perverted by civilization it served to emphasize the truth that man grows by development, not by aggregation.

(*b*) Romanticism: (1) It helped to disclose certain of the

deepest things in nature and human life by its emphasis upon the validity of feeling and intuition in the human soul. (2) By its discontent with the actual world and its attempt through art and literature to depict a truer and worthier one, it served to give an intensity and elevation to thought in the presentation of more spiritual ideals of life. (3) It tended to look upon literature, art, philosophy, the life of nature and the past from a purely religious standpoint, not merely deepening these, but *widening the religious consciousness* as well. (4) Through its very tendency to iconoclasm Romanticism gave rise to the demand and search for fact. (5) It asserted that the true spiritual life is not constrained and forbidding, but spontaneous, free, and beautiful. (6) Above all, perhaps, it stood for *man as man as its central interest*, since for it "above all nations is humanity."

(*c*) Idealism: (1) Becoming penetrated with *organic* ideas, served to set the errors and extravagances of Naturalism and Romanticism in clear relief, while asserting the independence, the validity, and true inwardness of spiritual life in a manner not possible to them. (2) While asserting the supremacy of the inner over the outer, Idealism maintained that only by the light of the inner can the world without be viewed and interpreted. (3) In the fact of consciousness, which *must build its own world of experience*, and in the moral law which is at once *autonomous* and *imperative*, Idealism disclosed the basis of an individualism and a type of society which while real is but "in the making," and therefore that (4) life is *not a fixed condition*, but a *movement*, through struggle and failure, towards further *individualization* and yet more intimate forms of *social unity*. (5) Idealism, starting with the fact of self-consciousness in man —since it is self-consciousness that makes him man—and attempting to discover the interrelations of the individual mind and of human institutions, showed that not in isolation, but only in an environment of social institutions is the individual to find fulfilment for his will and assert his freedom, since the institutional life of man is the objective expression of his freedom, of the moral ideal thus far realized. (6) Idealism asserted the connection of nature and history by means of the concept of development. It showed, moreover, not merely that man realizes himself only as he comes into relation with social

institutions, but that he comes to know himself only as he comes to know the objective world of nature as well. For idealism, nature is neither indifferent nor extraneous to the life of man. The opposition is but apparent, for in man nature is at once completed and transcended. From nature man's life begins: through nature he becomes self-conscious: the stimulus of nature is the condition of man's self-assertion: in mastery of nature is his self-realization. But for Idealism nature is intelligible and man intelligent because they are not completely isolable entities, but, with humanity, are *members of a greater whole*, an absolute, spiritual life, of whom and to whom are all things. (For the significance of Idealism as an interpretation of *the method of the personal life*, see the writings of Caird (E.) and Wallace. A fine, though brief, statement is to be found in John Caird's *Philosophy of Religion*, Chap. IX. The above characteristics are somewhat more fully developed in the monograph, *Hegel's Doctrine of the Will.*)

2. In turning to the consideration of Rousseau's educational theory the most important point to be noted is that as a theory it is altogether the logical implication of his general social philosophy. In both the fundamental idea is that of the natural goodness of human nature. Man comes into the world with no innate depravity. It is an evil education in degenerate, social institutions that corrupts him. Eliminate all such evil influences, and the very force of his inherent nature, in itself good, will assert itself and *impel him towards its perfection.* The *Émile* is but one phase of the larger social theory. Its central idea seems to be this,—the corruption of human life and human society is due to the artificial restraint imposed on the individual by intellectual culture and social organization. The educational theory, therefore, starts from the assumption that, if these restraints imposed by society and civilization are broken, and the original nature of man be given free play, a life of natural innocence and perfection will result.

(*a*) As in his treatises upon the inequality of man he traces the progress of the race from the natural to the civilized, so in the *Émile* Rousseau proposed an entirely similar problem. Émile is humanity personified, in the natural condition of childhood: a tutor teaches this child of nature naturally. Edu-

cation must through isolation free the individual from the contaminating influence of human intercourse. Later Émile is to enter the 'civilized' condition, the human relations of the present world. The main argument of the *Émile* may be outlined as follows: (1) The individual is naturally good. (2) Since the individual is debased by society the only hope of reform lies in an education *according to nature*. (3) The aim of such an education should be to make the individual independent and self-sufficient; in a sense, a republic in himself. (4) Education should be natural as a free expression of the individual's instinctive and impulsive life,—"*Nature's course of development.*" (5) The rational and moral nature of the child should be trained for the most part through the recognition and discipline of consequences. (6) Up to the twelfth year the education should be negative; the attempt not to gain time but to lose it, should be made. Let the body and the senses be developed but the mind lie fallow. (7) No religious prejudices should be permitted, no books read, save *Robinson Crusoe* and the book of Nature.

(*b*) A lack of uniformity in Rousseau's usage of 'Nature' should be noted. It is used to designate (1) an element in his general naturalistic philosophy, that man is naturally good, but becomes depraved by society. The fall of man is his fall into institutions. (2) As designating a state of liberty and equality, for which education should prepare. (3) In the sense of education according to the method or principles of human nature. (4) In the sense of education through contact with the things of nature, without the interference of man. In this case nature is used in the sense of inanimate or subhuman nature. Education in this sense means education through contact with physical nature.

(*c*) The appreciation and criticism of Rousseau's educational ideas naturally center about (1) the conception of education as the fundamental form of social reconstruction; (2) the conception of the state of nature; (3) the conception of the relation of the individual to society; (4) the confusion of natural spontaneity with spiritual freedom; (5) the conception of negative education; (6) the conception of education through isolation *versus* education through participation; (7) the idea

of the individuality of the child as point of departure in education; (8) the conception of the ethical personality of the child as motive in education; (9) his appreciation of the significance of the study of the child; (10) the conception of development rather than instruction; (11) his influence upon Herder, Goethe, Basedow, Kant, Pestalozzi, and indirectly upon Froebel.

3. Basedow (1723–1790) and his educational ideas—Relation to Rousseau—Basedow and Goethe—Goethe's preference for the *Orbis Pictus* to the *Elementary*—the *Book of Method* for parents and teachers—Education according to nature—Basedow on individuality—Realism.

4. (*a*) In an appreciation of the ethical and educational significance of the work of Kant, the following points should be noted: (1) The significance for philosophy of *the general inquiry into the conditions of experience.* (2) The significance of Kant's critical method in the determination of the philosophical *bases of education conceived as the process through which the individual gains control of his experience.* (3) His critical and educational interest. (4) The idea of organism as uniting the individual with nature, society, and the race. (5) Synthesis (*not necessarily appearing as object of consciousness*) as the fundamental form of the activity of consciousness. (6) The doctrine of the self-activity of pure reason. (7) The attempt to discover *the intimate structure of knowledge* and *the adaptation of objective nature to the human mind—of the intelligible world to intelligence.* (8) The unity of the theoretical and practical reason. (9) His doctrine of personality. (10) Morality as the aim of life, and duty as regulative in the educational process. "A pedagogy of the Will." (11) The actual content of his *Lectures on Education.* (12) The *cultural* and the *moral* aims. (13) *Reason* and *Faith* in the personal life. (14) The significance of Kant's moral idealism in subsequent thought.

[For a good statement of the place of Kant's thought in the history of education, see the introduction in Dr. Buchner's edition of the *Lectures on Pedagogy.* (*Kant's Educational Theory.*)]

(*b*) It is necessary to indicate briefly the significance of the Kantian epistemology for educational methodology. Fundamentally *the problem of subject-matter and method* in education is one with the question of epistemology in philosophy; that

is, the problem of the relation of subject and object, of reason and experience, of intelligence or mind to the world. The Cartesian dualism is the epistemology which underlies the ordinary views of the relation of subject-matter and method. According to Descartes, the mind and the world, consciousness and matter are absolute disparates. The mind on the one hand is an entity by itself, with its own peculiar nature, its formal faculties, and peculiar modes of operation. It can be studied in and by itself, quite apart from its surroundings, apart from its relations to the environment, as we would say in the terminology of the present. The world or nature, on the other hand, was the absolute opposite of mind, a purely material thing, at best a mere object for intelligence or spirit, but in itself, or in its own structure not conceived as *embodying* or *reflecting* intelligence or spirit. Against this dualism a reaction set in and in two directions—Empiricism and Rationalism. Empiricism, minimizing the work of mind, attempted to show how the mental world is but part of a material world and *is gradually built up through the agency of this wider material world.* This is practically the position of Hobbes, Locke, and, from one point of view, of Herbart. On the other hand, Rationalism, especially Leibnitz, proceeded to show how *the material world is a gradual evolution in consciousness.* Every monad, or individual soul, contains the world implicitly. Kant's significance consisted in his attempt to mediate between these two extreme positions: his attempt, in other words, to show that, if the mind's life is in any sense a process, evolution is as necessary as involution, and involution as essential as evolution.

The counterpart of philosophical dualism in educational theory and practice, as was said above, is the dualism which in large measure obtains in the conception of the relations between subject-matter and method at the present time. They are treated as though they were quite as separable as the mind and matter of philosophic dualism. On the one hand, the subject-matter is classified and arranged as a pre-existing, objective, material, ready to be imported into the mind. Method on the other hand is regarded as a purely formal affair, an altogether psychological matter, as though the mind were self-subsisting apart from its relations, or its environment, and had certain

powers, or modes of functioning in and for itself after the manner of philosophic dualism. There is thus an intrinsic separation between mind and subject-matter. Methods, of necessity, became mechanical for the simple reason that they became little more than statements of devices by which the hard and fast dualism between the isolated mind on the one hand with its ways of working, and a separated, isolated subject-matter on the other, might for the brief space of the school period be overcome. If, however, it be maintained that from the epistemological point of view the so-called 'subject' (mind) and the so-called 'object' (the world) are equally the differentiated aspects or results of a unitary process, we are inevitably forced to the conclusion that subject-matter and method are not isolable entities, but are fundamentally the terminal or differentiated aspects of the process of development of a unitary experience. Subject-matter, accordingly, is relative to the nature of the individual. It is not something hard and fixed, external to the mind. The educational process is not the outcome of a mind with pre-formed faculties *exercising upon external material*, nor is it the adaptation of a mind to a material completely predetermined. It is a process in which the organization of the material goes hand in hand with the organization or realization of a self or person. (See also, *Syllabus of a Course on the Philosophy of Education*, pp. 20–24, 41–43, 58–59. On the general significance of Kant's *theory of knowledge*, see Caird, *The Critical Philosophy of Kant*. Other factors coöperated with the Kantian epistemology to make the position of philosophic dualism seem untenable, factors which can be merely enumerated: (1) The development of the Nature-philosophy of Schelling and Hegel. (2) The growth of industry and an appreciation of its dependence upon science and nature. (3) The growth of the nature-sense. (4) The abandonment of the faculty psychology and the adoption of a psychology of a more social, voluntaristic, and pragmatic type. (5) The adoption of an evolutionary or dynamic view of reality and experience.)

5. In the work of Fichte, considered from the educational point of view, the following points should be noted: (1) The influence of Kant and Pestalozzi. (2) The ethical significance of the unitary, free, self-activity of reason, theoretical and

practical. (3) Reason in its practical aspect (*i.e.*, as *will*) fundamental. (4) The world intelligible only from the standpoint of spirit, as spirit only from the standpoint of will. (5) The world as the product of mind, as the material of duty manifest to sense, and the voice of duty as the highest manifestation of the divine. (6) The dependence of the ethical life upon a *system of limits*. (7) Action in accordance with one's own conviction of duty. (8) The somewhat negative conception of institutions coupled with the ideal of individual passion and service for the common life. The thought of Fichte is in life, action, service. His desire was ever not so much to inform, as to summon, to constrain his hearers to the formation of a deeper, more vital conception of *what life means, what it ought to be*. What it means, what it ought to be in the light of its meaning, is revealed not merely to reflection: rather is its reality disclosed to the *noble will*. (A comparison between Fichte's interpretation of life as the material of right and duty, with Schiller's interpretation as found in *The Artist, Grace and Dignity*, and *Letters upon the Æsthetic Education of Man*, would form an interesting study.)

6. For Goethe "man is most interesting to man and should perhaps be his only interest. All else that surrounds us is *either the means of life or the instruments which we use*." Goethe's one interest, his one problem, is that of human culture, the spiritual, educational possibilities of the human life of man in all its concrete intensity, richness, and variety. His writings are in a unique sense a fulfilment of Faust's aspiration to take upon himself the burden of our common humanity—"*ihr Wohl und Weh auf meinen Busen häufen, und so mein eigen Selbst zu ihrem Selbst erweitern*." The great works, *Faust, Wilhelm Meister, The Elective Affinities*, are educational treatises in the widest sense, and are apprehended or truly discerned only when studied from the point of view of their spiritual significance,—or, as Spinoza might say, as treatises *De Emendatione Intellectus*. The work of Kant is an inquiry into the nature, the presuppositions, the limits, of human experience. The work of Hegel is a study of the great forms of institutional life in which experience has been organized in the historic evolution of the human spirit. The work of Goethe is an interpretation of the

many-sidedness, the universality of human experience,—an attempt to "grasp the exhaustless life that all men live."

In a study of Goethe's legacy of thought some of the more fructifying ideas may be enumerated as follows: (1) The conception of life as fundamentally and essentially *personal, positive, and significant.* (2) "Everything that man undertakes to produce, whether by action, word, or in whatsoever way, ought to spring from the union of all his faculties." (3) The consequent failure of mere knowledge to satisfy the deepest needs of the soul. (4) Life as involving an element of experiment, but the failure of mere experience as such to satisfy the soul. (5) The fatalism of lawless passion originating in the conflict between elemental instinct and the moral law. (6) The conception of development through activity, opposition, struggle, aspiration. Life is essentially progressive. For Goethe the true merit of a life as of a work of art lies not so much in its regularity as in its power of expression. In man is the capacity of ever larger and larger life. (7) The idea of each individual mind as having within it a tendency to complete manifestation of itself. (8) The necessity of discovering the relation between capacity and activity. Self-development implies self-restriction. (9) The educational end within the life-aim or process. (10) The development of freedom through the appropriation of the principle embodied in the ideals imitated. (11) Self-forgetfulness as the result of fullest self-development and self-expansion. (12) Individual isolation, selfishness, agnosticism are self-destructive: reconciliation with reality is won by actual experience and faithful work in the loving service of man. (13) *The community of all life,* the possibility of expiation and of moral recovery. (14) The purity and piety of the heart the road to spiritual insight. (15) 'The three Reverences' as a programme of education. (16) *Das Ewig-weibliche zieht uns hinan.* (17) The divine immanence in all nature and human life.

In Goethe's theory of education (stated in briefest form) two distinct tendencies are apparent (1) concerning the individual as such, (2) concerning the individual as a member of society. His problem is how to secure adjustment to the collective life of humanity without interfering with the fullest perfection of the personality of the individual. As an indi-

vidual, man should unfold his innate capacities through aspiration, effort, struggle, and even failure, that he may attain to perfect culture, to the inner harmony of his own personal life. As a member of society he should take up into himself that education, common and universal, which embraces the type forms of human experience. Through self-expression and self-realization the individual should become an active organ of humanity, a conscious bearer of the social purpose. True education proceeds, therefore, through the fullest development of individual capacity and spontaneity in accordance with the general law embodied in nature and human institutions. Its task is to facilitate and to regulate the process of individual participation in the collective life of humanity.

7. Richter (1763–1825) was in many ways a typical representative of German life in the early nineteenth century. "In him," says Francke, "it seemed the ideal of an harmonious, all-embracing individuality—the main-spring of classic German literature,—had taken bodily form and come to walk among men." In the consideration of the two educational treatises, (1) *Preparatory Course of Æsthetic* (1804), and *Levana, or the Doctrine of Education* (1807), note (1) the Romantic influence, (2) Richter's conception of education as a liberation and realization of individuality—"the harmonious maximum of individual qualities taken together"; (3) as a social process; (4) his conception of the importance of early education, of the need of freedom and joyousness in children, of the educational significance of play; (5) the relation between his theory of play and the theories of Schiller and Froebel.

8. In the work of Schleiermacher the educational influence and significance of the following factors should be considered (1) his conception of the sacredness of individual character of personality; (2) the religious basis of the moral law and of the spiritual order of society; (3) his doctrine of institutions as objective reason; (4) his reconciliation of self-development (increasing individualization) and self-surrender (increasing participation) to the common life and humanity; (5) religion as the fundamental disposition governing the development and participation of the personal life.

9. In Pestalozzi (1746–1827) is found a remarkable instance

of a life endowed with deep and far-seeing intuitions, and penetrated with an unceasing love of the people and an enthusiasm for their education and improvement. In his deeply religious nature Pestalozzi reminds us of Comenius; in the intensity of his feeling and of his demand for freedom he resembles Rousseau; while in his lofty integrity, his firm adherence to right and duty, he resembles the philosopher Kant. His life is one long record of sincere consecration to the cause of education as the only certain method of material elevation, and of moral and intellectual regeneration—a method by which a people can be helped to a more industrious, more satisfying, purer and more spiritual mode of life. Herein is Pestalozzi's supreme claim to our remembrance, namely, that to him, perhaps, more than to any other man is due the movement towards popular education which was certainly one of the distinguishing marks of the past century. With his name there is usually united on the one hand the development of the method of sense-perception or of object teaching; on the other, the development of a psychological basis of instruction; but both of these seem secondary merits when compared with his deep and passionate insight into *the social importance of the elevation of the people and the methods and suggestions which are owed to him for the realization of that end.*

(*a*) Certain dominant elements in his character should be noted: (1) an acute sensibility of nature, (2) an intense love of individual freedom, (3) a moral rigorism, a lofty idealism and optimism, (4) a deep humanitarianism,—an unselfish love of the poor and unfortunate among mankind.

(*b*) In the study of Pestalozzi's life note especially: (1) His early experiences, and the social and industrial conditions in Zürich. (2) The revival of literature and the study of philosophy, the demand for greater simplicity of life and manners, the movement towards intellectual and political freedom. (3) The influence of Pestalozzi's teachers, especially Zimmerman, Bodmer, Breitinger, the influence of Rousseau, Fichte, and Kant. (4) His various philanthropic experiments, and his experience in teaching. (5) The high, ethical purpose ever before his mind, from which he never turned aside, the moral and social elevation of the people.

(*c*) While all his writings have educational bearings, the following appear to be of special importance in studying the development of his doctrine and of its various elements in their mutual relations: (1) *The Evening Hour of a Hermit* (1780). This consists of a series of aphorisms—180 in all—on general educational principles and on the rise of a people through education. In it is to be found the germ of Pestalozzi's educational theory: (i) a criticism of the artificial methods of the schoolroom; (ii) the right of the individual to education; (iii) the development of the soul through inner culture; (iv) the necessity of grounding education and the moral elevation of a people in a purer and more vital religious life. (2) *Leonard and Gertrude*, Vol. I (1781), Vol. II (1783), Vol. III (1785), Vol. IV (1787). A social romance which Pestalozzi regarded as his "first word to the heart of the poor and of the abandoned of the land." Its central theme is the physical, intellectual, and spiritual elevation of a people *through work, through piety, and through education*. The important ideas developed might be briefly stated thus: (i) an education of individuals suited to their station in life; (ii) the development of the latent powers of every individual and the inculcation of a piety of the heart; (iii) the place of industries in elementary education; (iv) the social importance of education and the interrelation of home, school, church, and state in maintaining and elevating the social life. (3) *Researches into the Course of Nature in the Development of the Human Race* (1797). In many respects a remarkable work, in which he seeks to justify the great importance which he attaches to nature in the education of man. Written at the suggestion of Fichte, it amounts to a study in the evolution of man. He breaks away from the atomistic theory of Rousseau and attains to the idea of humanity as an organic unity. It is pervaded by a theory of morality, thoroughly Kantian in spirit. It suggests the subsequent attempt which has been made to base education upon the law of evolution. He distinguishes three levels in the development of man: the *animal*—the product of nature; the *social*—the product of the race or of social relationships; the *moral*—the product of man himself, consisting in the development of the higher elements of his nature implanted by the Creator in the human soul.

(Compare Fichte's doctrine of the State as having to do with the external nature of man only.) In the volume two important conclusions are reached: (i) the parallelism between the evolution of the race and the development of the individual; (ii) the desirability of founding the laws for the education of the individual on the laws of human evolution. (4) *How Gertrude Teaches Her Children* (1801). This work presents the history of Pestalozzi's methodology, as it may be called, or his views on the aims and methods of instruction. (5) *The Song of the Swan* (1826). *My Destinies as Head of the Institutes at Berthoud and Yverdon* (1826). To this should be added, *Letters on Early Education,* written to Greaves, an Englishman, between 1818 and 1820.

(*d*) In considering the social philosophy of Pestalozzi note: (1) The political and social character of the period. (2) The influence of Rousseau; points of resemblance and difference. (3) Pestalozzi's conception of the interdependence of human life. (4) Influence of Romanticism: the right of the individual to freer, more natural self-expression. (5) The actual content of Pestalozzi's social theory: (i) the relation of the individual to society; (ii) the three levels of human life, natural, social, moral; (iii) the *moral* as above the *social;* (iv) the individual's recapitulation of the life of the race. (6) The inter-relation of the institutions that educate—home, church, government, school. (7) Relation between Pestalozzi's social theory and his theory of education. (The somewhat scattered materials of Pestalozzi's social philosophy and psychological theory have been gathered together and systematized by Rothenberger, *Pestalozzi als Philosoph* in *Berner Studien zur Philosophie.*)

(*e*) In turning to the consideration of the more important elements in the educational theory of Pestalozzi it is first of all to be noted that, (1) while Rousseau had regarded education as a means whereby individuals might be saved from the corrupting and enslaving influences of civilization, Pestalozzi ever regarded it as a fundamental means to raising human beings into an intelligent, social, and moral life. It is true that Pestalozzi was strongly influenced by Rousseau, and attempted to carry out the Rousseau plan of unsocial education with his own child. He perceived the impossibility of the plan, yet he never

completely got away from *Rousseauism*, retaining, as did Fichte, in the background of his consciousness the doctrine that human institutions were at best a somewhat mechanical or artificial appendage to the individual life. The doctrine that the institutions of society constitute that system of life in which alone the individual becomes a person was an insight of later writers in education. Pestalozzi, however, did not abandon the best element in Rousseau's teaching—the necessity of making the child and his circle of experience and activity the starting-point in instruction. (2) While Pestalozzi was never able to reach a satisfactory or logical account of the relation of the individual and society, nevertheless he saw clearly that the individual left to himself, or deprived of education, could never become truly human. It is necessary for society, in order to its own preservation, to transform the natural man into the social man. The education of the people thus becomes the highest social duty. (3) Education must be conceived fundamentally as national education. All attempts at the culture of the intelligence and the elevation of the moral nature of the individual will be unavailing, which are not the outcome of the whole spirit and life of a people and which do not return to the people as their original possession. Pestalozzi not only recognized the social importance of education, but discerned the necessity of correlating the great forces of the community life, the home, the school, the church, and the state, with a view to maintaining, elevating, and perpetuating the social life of the people. This idea of elaborating and elevating education *into a social or national system* constitutes one of Pestalozzi's great claims to remembrance. (4) As an outcome of his contact with the life of the common people Pestalozzi discerned that the fundamental source of their barren and unprogressive life was the lack of recognition on their part of the laws of nature and of life, and their consequent disorder and levity, the absence of moral and religious sentiment, the prejudice and revenges against the authorities who only too readily profited by their weaknesses. The source of their spiritual elevation he sought in education. But first of all he had to discover its sure and simple methods and materials. As a result of his inquiry Pestalozzi took as the fundamental principle of his method, that education, if it is to

fit man for his destination in life, must proceed in accordance with the laws of nature. In other words, experience and intuition led him to believe that education must not be any arbitrary intervention between the child and nature, between the individual and the laws of nature and humanity; rather must it assist the natural development of the individual, not hindering or doing violence to it; following, not forcing; developing, not moulding in accordance with an artificial or mechanical programme. (5) Pestalozzi thinks of the soul not as a mechanism but as *an organism endowed with an impulse towards its own growth and realization.* It is a unity of physical, intellectual, and spiritual powers, existing at first only in germ; and while dependent for its sustenance first of all on its sense-surroundings, yet not physically bound, but capable of raising itself above the level of sense and impulse to the plane of the intellectual and the spiritual, while still retaining the former as instruments of its purposes. Development, whether in child or man, is no mere effect of outside forces or of foreign will beyond the individual: it is rather the individual's inborn power of effort, later on flowering into free and autonomous will which stirs to feeling and to thought. With Kant, Pestalozzi regards the capacities of the soul as its immanent and constitutive essence. The common need of humanity is the growth and development of man himself. Nature has done her part: let man do his! Teaching, then, is nothing more than the *art of helping the impulse, the striving of nature after its own development.* But in true development there is harmony and proportion of parts, mutual adaptation and adjustment of elements. Education, indeed, should aim at "the harmonious and equable development of the human powers." Its work is being accomplished in raising man's nature from the sensuous plane of merely physical existence to that level of life and happiness which is possible for him through the harmonious upbuilding of body, mind, and spirit; the powers of art, of mind, of heart united by an organic bond and coöperant to a common end. And the ultimate forces in this upbuilding of man's true nature, Pestalozzi declares, are *love* and *faith;* forces which together unify man's powers of knowing and acting, love proceeding from faith and both in turn from God, the Father of man's life,

necessary thereto as are the roots to the tree. (6) In recognizing the organic nature of the mental life Pestalozzi was led to emphasize the continuous character of mental development, and to make "continuity" a fundamental element in his method. For him the mental life was essentially a process of development or unfolding and only incidentally one of acquisition and possession. Whilst seeking, therefore, to exercise and strengthen the capacities of the child by means of incitements to activity he endeavored to discover points of contact within the child's experience, to proceed in uninterrupted course from one point to another, taking care that the first should be fixed in the mind before proceeding to the second.

(*f*) The more important elements of permanent significance in the work of Pestalozzi may be noted in outline: (1) The conception of education as a fundamental source of social elevation. (2) The conception of education as essentially national education. (3) In a very real sense Pestalozzi became the creator of the modern elementary schools in that, while conceiving the educational aim to be "the development and education of humanity from its own center," he did not confine such development of the inner powers and capacities of human nature to particular classes of society, but maintained that the poorest and lowliest should participate in its benefits. Pestalozzi recognized the rational organization of elementary education as a matter of primary importance. (4) His recognition of the central and fundamental influence of the home life, and the necessity of correlation and coöperation of the various educational factors of the community in the education of the individual. In connection with the recognition of the significance of the home life in education is Pestalozzi's demand that a systematic development of the child's earliest consciousness should precede all real instruction. The mother is the child's first and best teacher. (5) His demand that instruction be based on the immediate experience of the individual; that sense-perception be made the basis of all intellectual instruction; that in the method of instruction all arbitrariness be eliminated, and a natural mode of procedure based on the principle of inner activity substituted in place of an artificial mechanical one—in a word, there should be naturalness of method in teaching and

learning. (6) His attempt in the government of children to introduce the method based on interesting and developing activity, on thoughtful guidance, on a loving treatment of the pupil—since love is the essential form of all human learning—in place of one based on mere compulsion or merely mechanical discipline. (7) Pestalozzi restored to credit the processes of the method of sense-perception. For him, in elementary education sense-perception is the fundamental principle of instruction, indeed, the absolute foundation of knowledge. Considered by itself it is nothing else than the mere presence of external objects to sense, and the *mere stirring of the consciousness of their impression.* In other words, Pestalozzi would make the sense-experience of the child the educational starting-point. Clear perception is the basis of clear thinking. The world lies before the child at first merely as a mass of confused impressions. In large measure it is the task of elementary instruction to bring definiteness out of chaos, to separate objects from one another, grouping the like, in order that clear conceptions may be formed. Out of the confused impressions, definite and clear perceptions may emerge, and on the basis of clear perceptions distinct ideas may gradually be built up. The development of the faculty of thought thus has its starting-point in grouping, separating, and comparing the objects of sense-perception. (8) It was ever Pestalozzi's aim to discover a method of instruction by which the individual might attain an intelligent contact with the real world. This, he thought, must be brought about through a simplification of instruction. *What, then, are the great rubrics of instruction?* What are the connecting links between the mind of the individual and the real world by which he is encompassed? "I long sought," he writes, "for a common psychological origin for all these arts of instruction, because I was convinced that only through this might it be possible to discover the form in which the cultivation of mankind is determined through the very laws of nature itself. It is evident this form is founded on the general organization of the mind, by means of which our understanding binds together in imagination the impressions which are received by the senses from nature into a whole, that is, into an idea, and gradually unfolds this idea clearly. . . . At last, suddenly, like a *Deus*

ex machina, came the thought—the means of making clear all knowledge gained by sense-impression comes from *number, form, and language.*" These are, together, "the elementary means of instruction, because the whole sum of the external properties of any object is comprised in *its outline* and *its number*, and is brought home to consciousness through *language.*" Number, form, and language, as typical materials, form the elementary means of instruction. These, therefore, number, form, and language, are made by Pestalozzi the fundamental subjects of elementary instruction, in that they are the essential conditions of distinct and definite knowledge. These should be taught with the utmost possible simplicity, comprehensiveness, mutual connection, and continuity. It is needless to say that the value of Pestalozzi's attempt to establish an alphabet of sense-perception lies in the originality of the endeavor rather than in positive achievement. (Compare this attempt of Pestalozzi to attain an alphabet of sense-perception with the theory underlying the *Gifts* of Froebel, and the *A B C of Sense-Perception* of Herbart.)

References:

In addition to the works of the authors named in the text, the various histories and encyclopædias (German) of education and the separate monographs of Buchner (*Kant*), Davidson (*Rousseau*), Luqueer (*Hegel*), Pinloche (*Pestalozzi*), see the works of Adamson, Bonar, Bosanquet, Caird, Erdmann, Falckenberg, Francke, Höffding, Jodl, Paulsen, Pfleiderer, Robertson, Royce, Scherer, Seth, Thomas (Introduction to his edition of Goethe's *Faust*), Wallace, Windelband, Wundt, to which reference has been made in preceding chapters: also, Schleiermacher, *Die Gute Lebens Art; On Religion* (Oman); Fichte, *Popular Works: The Nature of the Scholar The Vocation of Man, The Doctrine of Religion* (Smith); Hegel, *Philosophy of Right* (Dyde).

Further problems for study:

1. The individual and his relation to society as reflected in the work of (1) Kant, (2) Fichte, (3) Goethe, (4) Pestalozzi, (5) Schleiermacher, (6) Hegel.
2. The background of (1) political theory, (2) economic theory, (3) religious doctrine during this period.
3. Education as *world-building.*
4. The significance for a philosophy of education of Kant's problem concerning *the possibility of experience.*

5. The significance of Epistemology for educational methodology.
6. Education and *teleology*.
7. The condition of German Schools from 1750–1800.
8. Motives underlying the Elementary School.
9. The historical conception of industrial education.
10. The concept of civilization.
11. "Rousseau took no step forward in education."—Davidson.
12. Pestalozzi's educational experiments.

VII

REALISM IN PHILOSOPHY AND EDUCATION: HERBART

1 (*a*) Among the philosophic opponents of the Idealistic philosophy developed by Fichte, Schelling, and Hegel, the more important are Beneke, Herbart, and Schopenhauer. The opposition of Beneke was directed chiefly against the method of the Idealists. Herbart, *starting with experience*, ranged himself against the ontological position of Idealism, denying that it is possible to deduce everything from a single principle, and opposing its monism with a pluralistic metaphysics, and its philosophy of becoming with a philosophy of being. Reality is an indefinite multitude of irreducibly different entities. Schopenhauer, in turn, opposed the Idealistic estimate of the worth of life, denying rationality both to the world and to the world-ground. All considered themselves true disciples of Kant. From the point of view of exact scientific method Herbart is undoubtedly the most important name among the opponents of Idealism. He claimed that his system was more in harmony with the spirit of Kant than were the systems of the Idealists. He used to describe himself as a "Kantian of the year of 1828." However this may be, it is not a difficult matter to recognize that, even though Herbart appropriated a determinable element of the Kantian system, nevertheless he introduced in it a foreign element through the influence of which the Kantian element was modified in several fundamental respects.

(*b*) Herbart (1776–1841) before entering the University of Jena in 1794 had already gained some acquaintance with the systems of Wolff and Kant. In the university he came to

know Schiller and Fichte. Two years after entering he handed to Fichte, his teacher in philosophy and the follower of Kant, a critique of two of Schelling's treatises, in which it was clearly shown that he had already broken with Idealism. His first meeting with Pestalozzi was in 1797. At first connected with Göttingen, Herbart became professor in Königsberg in 1809, where in 1810 he established and conducted a seminary in education until 1833. From 1833 till his death in 1841 he was professor of philosophy in Göttingen.

(*c*) Rejecting an idealistic metaphysics with its philosophy of becoming, Herbart accepts a pluralistic metaphysics and a philosophy of being. For him, as for the Eleatics, being is absolutely simple. In his reaction against the Idealism of Hegel he adopts a position which is practically a union of the Eleatic and Atomistic points of view—of Parmenides and Democritus. *Analysis of what is given in experience* forced him to believe that we must rest content by positing many simple existences, Reals—the ultimate ground of things. Such a Real was God, such the soul, such the elements of matter. He holds that appearance is not an essential quality of being; indeed, being and appearance are quite different in essence. The true reality does not become, does not change, is neither increased nor decreased. In the manifold of Reals, each particular Real is independent of all others. We can know nothing at all of the proper nature of Reals, hence we cannot know whether they are material or spiritual. Herbart's system is in a way a mechanical monadology. To Leibnitz he owed the idea of the soul as a monad, but allowed to it simply existence, whereas Leibnitz (with Kant and Hegel) laid stress on activity, unity, synthesis. On the one hand, Herbart declares that "being is absolute position; its concept excludes all negation and all relation," and "the soul is a simple substance not only without parts, but with no plurality whatever in its quality." On the other hand, the monad or Real has the power of self-conservation though not of self-realization. This quality of the Reals is more evident in those beings to which we attribute force and life, and which rise to consciousness in our inner experience as sensations. Indeed, Herbart admits that the only example of self-conservation accessible to us is that of our own sensations.

Thus, after all, he, in his way, conceives the Reals in analogy with our own psychical states. The following difficulties are retained by Herbart in his metaphysics: (1) the dualism of appearance and reality, (2) the denial of change to the Reals. According to Herbart every continuum is excluded from reality. If he insists on the independence of the Reals, their communion remains unaccountable.

(*d*) Herbart's psychology is of the *association* type according to which neither the content nor the form of knowledge is furnished by the mind. The problem of the self presented itself to him first of all in connection with Fichte's Ego, which is conceived in unceasing self-activity. The soul is a Real like other Reals; its sensations and ideas are expressions of its self-preservation. It is an error to look upon it as an aggregate of all sorts of faculties. There exists neither feeling, nor knowledge, nor willing, as faculties or as innate forces or energies. There is but one source of mental life, the presentation or sensation which arises in the soul when it has to maintain itself against another soul. At first, merely blank, formal unity of which nothing can be said excepting that it can act in self-defence; the soul shows its character by what it does in the struggle for existence. Its peculiar mode of self-defence is a sensation or presentation. It admits presentations to its domain. Admission proves to be occupation. Its former assailants are, so to speak, naturalized as ideas. Henceforth the varying mental contents contend for supremacy, uninfluenced and unhindered by the soul. Presentations are thus the ultimate elements of the mental life, whose subsequent unity and complexity are to be explained through the mechanical interaction and combination of the primary elements. The development of the mental life consists in the increasing conflicts and harmonies among its constituent units: some of which blend together by means of *assimilations;* others again unite in groups by means of *complications;* while others *remain at variance* among themselves; the resulting whole constituting the ego or self.

(*e*) The necessity for assuming a psychical Real lies in the fact that our ideas are always *reciprocally related and interact one with the other.* It is a rather curious phenomenon that Herbart should not have developed more fully the implications of

his doctrine that there is no unconnected manifold in consciousness. There is, he maintains, a continuous tendency among the ideas to form one single activity, until by assimilation and complication there arises a total force which we designate the ego or self, a product rather than a principle, and which determines the nature of subsequent assimilations. Only that which is capable of blending with the prevailing group of ideas ('apperception') can attain to psychical existence. The apperceiving group of ideas determines the nature of the personality. Thus for Herbart the 'self' is a composite; consciousness is not the condition but rather the resultant of ideas which are primarily forces. "The Ego is a result of presentations which unite and interpenetrate one another in a single substance (the soul)." Just here there seems to be a conflict between Herbart's psychology and his metaphysics. If the unity of consciousness can be explained by the reciprocal action of the elements, the metaphysical explanation of the unity by a soul-substance is superfluous: if, on the contrary, he starts with a soul-substance he cannot look upon the unity merely as a product. First we have inactivity among the 'Reals'; then collisions or attacks, against which souls or Reals react. These 'reactions' are presentations. The intellect is simply the sum of these and their combinations conceived in their totality. Feeling arises through the partial suppression of one presentation or idea. Desire arises in the successful struggle of presentations or ideas against others which tend to suppress them. Desire issues in will when it is accompanied by the belief that the object is attainable. According to Herbart, therefore, we are to think of the mind not as an organism but as a mechanism.

(*f*) Herbart appears to hold that every idea is a distinct entity (originating, it is true, as has been seen, as a reaction of the soul to stimuli, and therefore representing a certain qualitative form of the soul itself). His theory is an extreme form of psychological atomism. He does not recognize, however, that if the essence of conscious life is a synthesis or combining activity, the particular elements can possess no independent energy. He returns, in a sense, to a type of faculty psychology. When once produced, the idea is an existence by itself, possessed of its own dynamic force, striving to come before consciousness;

striving, indeed, to attain the summit of consciousness. It is the same idea whether in or beneath consciousness. Various ideas, of course, help or hinder one another in attaining and retaining the field of consciousness. A presentation or idea coming into consciousness tends to draw those allied to it also into consciousness and to force out those unlike. Ideas which are similar, congruent, assist one another, and *vice versa*. It will thus be recognized that the essential point in the control of experience (*i.e.*, in education) will be to get the right grouping of like ideas, to form strong associations among the important ideas so that they will always reinforce one another. This seems to be the fundamental explanation of the Herbartian emphasis upon *correlation* and *concentration*.

2 (*a*) Education as a science is based, according to Herbart, on ethics and psychology. The former points out the goal of education; it sets the problem; the latter the way, the means, and the obstacles to the solution of the problem. This relationship involves the dependence of education on experience inasmuch as ethics includes application to experience, while psychology has its starting-point, not in metaphysics alone, but in experience correctly interpreted by metaphysics.

(*b*) The aim of education is morality or virtue: its means is *educative instruction*. "Virtue is the whole of the educational purpose." Inner freedom is the complete harmony of willing and moral insight. The "good will,"—the most important characteristic of Herbart's conception of morality (compare Kant),—"is the steady resolution of a man to consider himself as an individual under the law which is universally binding."

(*c*) "The ultimate purpose of instruction is contained in the notion, virtue, morality. But in order to realize the final aim, another and nearer one must be set up. We may term it many-sidedness of interest. The word 'interest' stands in general for that kind of mental activity which it is the business of instruction to incite. Mere information does not suffice; for this we think of as a supply or store of facts, which a person might possess or lack, and still remain the same being. But he who lays hold of his information, and reaches out for more takes an interest in it."—*Outlines of Educational Doctrine*, p. 44. (See also, *Science of Education*, p. 62.)

3 To Pestalozzi Herbart owed, in part, the doctrine of interest, but he elaborated and transformed it. He maintains that Pestalozzi's service to education lay in his recognition of the need of creating in the child a definite and clearly observed experience; that we should not act as though the child had a body of experience, but see to it that he get one. In the doctrine of interest put forward by Herbart and its emphasis on the claims of the individual, traces may be found of the influence of Rousseau working through the ideas of Pestalozzi.

(*a*) According to Herbart, "ideas spring from two main sources,—experience and social intercourse. Knowledge of nature—incomplete and crude—is derived from the former; the latter furnishes the sentiments entertained towards our fellowmen, which, far from being praiseworthy, are on the contrary often very reprehensible. To improve these is the more urgent task; but neither ought we to neglect the knowledge of nature." Ideas gained from experience and social intercourse constitute the child's *circle of thought*, which is to be so formed by instruction that right judgment and right willing may grow out of it. "Man's worth does not, it is true, lie in his knowing, but in his willing. But there is no such thing as an independent faculty of will. Volition has its roots in thought; not, indeed, in the details one knows, but certainly in the combination and total effect of the acquired ideas."—*Outlines of Educational Doctrine*, p. 40.

(*b*) The aim of instruction is "so to form the pupil's circle of thought that right judgment and right willing may grow out of it." Its *specific* object is to stimulate and develop many-sided interests. The procedure of instruction with reference to the circle of thought of the pupil is either (1) analytic or (2) synthetic.

(*c*) The circle of thought gained from (1) experience, (2) intercourse, lends itself to the development of two main forms of interest, (1) of cognition, (2) of participation. With reference to the circle of thought educative instruction develops as (1) *interests of cognition*, the spirit of observation (empirical), of speculation (scientific), of taste (æsthetic); as (2) *interests of participation, i.e.*, love and feeling of dependence upon others, sympathetic participation (sympathetic), public spirit (social), religiousness (religious).

(*d*) Interest as the specific object of instruction has four qualities. It is (1) far-reaching or continuous, (2) immediate, *i.e.*, it must be its own reward. The activity of true interest must arise from a disinterested devotion to the subject in hand. (3) Many-sided. "Interest arises from interesting objects; many-sided interests originate in the wealth of these, and to create and develop it is the task of instruction."—*Science of Education*, p. 120. (4) Proportionate. There should be balance among the various classes of interest.

(*e*) Methodical instruction involves (1) *clearness*,—in presentation of specific facts, or the elements to be learned; (2) *association*,—of these facts with one another and with other related facts, formerly acquired, in order that assimilation and apperception may be as complete as possible; (3) *system*,—the coherent ordering of what is associated; (4) *method*,—the application in exercises, involving the activity of the pupil, of the facts, rules, principles, and classification so obtained.

(*f*) For Herbart, as has been noted, experience and intercourse are the two constant teachers of men. These are the two original sources of the mental life. The ideas gained from these two sources must form the apperceptive basis of the instruction process in the school. Starting, then, with this apperceptive basis, presentative instruction takes two main lines: (1) *the natural-scientific*, including geography, mathematics, and natural history, serve to supplement almost exclusively the experience of the pupil and hence supply the sources of interests of knowledge or cognition; (2) *the historical*, including history, literature, language, and art, serve to supplement both the pupil's experience and intercourse with others, and supply the sources of the interests of participation or association with others.

4 (*a*) Herbart, as was noted above, denied that the mind is possessed of certain innate powers or activities. (1) The doctrine of faculties has its origin in the tendency to treat what were merely the prominent classes of mental states as real forces or activities producing particular effects. (2) Nor can we accept the Kantian notion of the Ego or Self as a synthetic activity formative in the upbuilding of the experience-process.

(*b*) Presentations or ideas within the mind disturb and inhibit one another, and the entire psychical life is to be explained

as a reciprocal tension of ideas. This fact of tension causes ideas to lose in intensity, and those of lower degree of strength tend to be forced below the threshold of consciousness. Although an idea displaced by another of superior strength fades or sinks below the threshold of consciousness, it does not by any means disappear from the soul, but may presently rise again to clear and distinct consciousness. Every idea persists in the soul: its displacement in consciousness by another does not annihilate it: it but renders it latent.

(*c*) Herbart lays a particular stress upon the nature of the process by which newly entering presentations or ideas are "assimilated, ordered, formed, and in part altered" by the ideas already present in the mind. The importance of his work in this connection should be fully recognized. He makes use of the term 'Apperception' to designate the general process by which individual perceptions, ideas or complexes of ideas, are brought into relation to our previously existing system of ideas, and, assimilating with them, are raised to greater clearness and distinctness. This is a central thought in the system of Herbart, from which he proceeds and to which he continually returns. In his philosophical explanation he took as his starting-point certain thoughts of Leibnitz, while in its educational interpretation he was undoubtedly influenced by Pestalozzi.

(*d*) For Herbart, then, it is possible to explain mental development by means of the one comprehensive process of *Apperception*. By it he seems to understand the interaction of two analogous presentations or ideas or groups of either, in such a way that the one is more or less transformed or reconstructed by the other, and ultimately fused with it. The process, therefore, is one (1) of assimilation, in which the new is fused and incorporated with the old; (2) of reconstruction, through which previously existing ideas are raised to greater clearness and distinctness, and thus to a higher degree of consciousness.

(*e*) Apperception as the essential process in mental development becomes, therefore, for the Herbartian, the essential basis of educational method. Without asking the question for the present whether Apperception is a complete explanation of mental development, it may at least be admitted (1) that our knowledge, whether as identification, comparison, or subsump-

tion, is a process of associating the new with the old; (2) that in the interaction of the new and the old in the knowledge process, the new is assimilated according to the individual's previously existing system of ideas, and the old transformed or reconstructed in the light of the new; (3) that, in order to the control of experience through instruction (i) all new knowledge must be the development and reconstruction of previous knowledge, (ii) on a level with the pupil's experience, neither too new nor too strange, (iii) the presented material must be given in organized groups or series.

5. (*a*) It would seem to be fair to summarize Herbart's contribution to educational theory under the following headings: (1) His contention that both nature and mind are characterized by conformity to law. (2) His statement of the educational foundations, psychology, and ethics. (3) His insistence on morality, or virtue, as the aim of education and upon the connection between intellectual and moral development. (4) His reconstruction of the doctrine of Apperception as a fundamental principle in educative instruction. (5) His conception of interest as a factor in instruction. (6) His analysis of the formal steps in the instruction-process. It is not, of course, asserted that Herbart in any one of these lines was wholly original, but the definiteness with which he stated the problems and indicated their interrelations has forced upon subsequent writers in educational theory a consciousness of the need of their still clearer definition and fuller reconstruction.

(*b*) Over against the doctrine of Pluralism as held by Herbart we may, for purposes of comparison, set in outline the general position of Idealism against which Herbart strenuously contended. Idealism, it may be said, maintains: (1) Each finite thing or being is part of a larger system. (2) Each finite thing or being is a positive self-affirming unity, possessing its own peculiar life and activity. (3) The impulse or endeavor of each finite thing or being (an expression of the Absolute in a definite and determinate way) to maintain itself in existence, to realize itself according to its own peculiar life and activity, is the actual essence of the thing or being. (4) In all things and beings this general principle of expression, manifestation, or real-

ization is the same—but with the human being it is the same with a difference. *For man becomes conscious of his self-realizing impulse.* Thus the life open to him is indefinitely richer in content than that bestowed on any other creature—the life of intelligence, of social relationships, of religion. If Herbart had recognized the significance or the implications of certain of his own admissions, (1) that we cannot but conceive the Reals in analogy with our own inner states, (2) that there is no unconnected manifold in consciousness, his Realism would doubtless have been considerably more in harmony with Idealism than it is.

(*c*) Herbart contends that the science of the reality of things (*metaphysic*) must be kept entirely apart from the science of the estimation of worth (*æsthetic*). There is, he maintains against the Idealists, no principle of knowledge which can unite in itself the *explanation of reality* and the *proof of worth.* Metaphysics ends with the assumption of Reals existing out of all relations: Æsthetics (*i.e.*, the science of the estimation of worth, æsthetic or ethical) is concerned not with realities, but with relations between realities. It will, therefore, be recognized that Herbart fails to establish any organic or fundamental connection between his metaphysics and psychology on the one side and his ethics, dealing with relations of worth among volitions, on the other; between what is and what ought to be. His ethics, being fundamentally æsthetic in character, however much they may be said to center about the will and activity of an agent, do not have their ultimate foundation in the will nor in the concept of an end or ideal which ought to be striven for. He does not, in other words, with his disciple Lotze, find in what ought to be the basis of that which is. Herbart's ethics and theology are united in a manner quite as external as are those of Kant.

(*d*) It must be acknowledged, moreover, that Herbart's account of the formal simplicity of the soul's nature presents a rather serious menace to the acceptance of his psychology as a basis of educational method. In his account of the nature of the soul he, apparently, at first abandons entirely the thought of activity. It is, to begin with, alien to all relations and needs them not,—does not need, indeed, to maintain itself against

them. In the exigencies of explanation Herbart endows the soul with a kind of activity, that of acting in self-defence. Just here, it may be asked, does not he unconsciously assume what he had to begin with consciously rejected, namely, self-activity?

The soul, endowed with the power of self-conservation, reacts and incorporates the antithetical "reals" as presentations. But by introducing into the soul the power of self-maintenance against opposing "reals" Herbart is confronted with a dilemma: (1) either there is mere antagonism which would lead to nothing—not even presentation, or (2) the soul and that by which it is confronted are positive elements in a larger life or process from which the soul draws (under the guidance of an indwelling unity) an outside element which it responds to, assimilates, and thus makes instrumental in its own development. By denying to the soul a synthetic principle, or neglecting the significance of the union of elements within consciousness, Herbart, it would appear, either fails to explain, or explains away, individuality.

But for Herbart the soul's power of self-conservation is at best an endowment of only short duration. If the soul was ever active in its assertion against the stimuli which came from without, it never was active but once. As Lotze, Herbart's most distinguished disciple, remarks, "Everything further that happens in it, the formation of its conceptions, the development of the various faculties, the settlement of the principles on which it acts, are all mechanical results which, when once these primary self-preservations have been aroused, follow from their own reactions; and the soul, the arena on which all this takes place, never shows itself volcanic and irritable enough to interfere by new reactions with the play of its states and to give them such new directions as do not follow analytically from them according to the universal laws of their reciprocal actions."

(*e*) Into Herbart's account of interest and attention, moreover, grave inconsistencies seem to enter, even though it be freely admitted that from the point of view of educational theory it has a considerable amount of suggestion. If we abide by psychology as an educational foundation, it is necessary to have a certain consistency between the foundation and the super-

structure. If we should abide by Herbart's psychology, interest and attention would be the result of certain combinations of ideas—purely reflex things: *e.g.*, the sentence, "I am attentive to something" would mean that the idea of this something rises into consciousness by its own strength. In his educational theory, however, Herbart comes to speak of both attention and interest as forms of self-activity. How, it may be asked, if the idea be primary and self-existent as at first decided, can we say that attention and interest are forms of self-activity? In the one case it is the mere product of the action and reaction of ideas; in the other it is *psychical*, or *self*-activity.

(*f*) There have been three important historical conceptions in psychology: (1) the conception of the inner life as the expression or manifestation of a number of distinct faculties or powers with which the subject is endowed; (2) the conception of which the Herbartian and the English Associationist doctrines are typical; (3) the conception which represents the mental life as a development, the varying forms of which are to be represented as stages of the development itself. Instead of giving a categorical denial to the Herbartian theory of interest and attention as mere products of the action and reaction of ideas, it may be well to place over against the Herbartian psychology an outline of a psychology of a different type which seems to afford a more secure foundation for both interest and attention, and, on the whole, one more conformable to the facts of experience. The outline, sufficient for our present purpose, may be given as follows: (1) The mental life presents itself as a teleological system or process, a series of means and ends, the outcome of a continuous co-ordination or functioning of two elements, *self* and *environment*, the unity of which is found in the general process of control over the conditions of life. The self is a concrete, specific activity, constantly directed to the accomplishment of something,—not only the bearer of the experience process, but an efficient agent in its furtherance. The self is real only in so far as it continues to act, to become, to progress. (2) The fundamental and central element of the psychical life is not sensation or idea, but activity. From this point of view all phases of psychical activity may be grouped about two fundamental types—*Habits* and *Accommodations*. (3)

Ideas are not (as Herbart would appear to hold) things which stand apart from the subject, in mechanical juxtaposition to the self, but are instrumental in the furtherance of the life-process. They are (i) methods of registering past experiences, and (ii) plans of action, leading to the organization of future experience. Knowledge is teleological, functional. Sensations and ideas are instrumental. Herbart's atomic theory of ideas (as, ultimately, his theory of the individual self) is analogous to the political and social theories of Rousseau.

(*g*) If the third conception of mental life, outlined in the preceding section, be the one more conformable to the facts of experience, it would seem that interest and attention have their foundation not in the action and reaction of ideas, but in the adjustments and accomodations of the self in the process of its realization. They are functions of the active subject,—a subject whose very essence lies in its activity, its manifestation, its self-expression. It is in connection with *the realization of ends* that the phenomenon of interest manifests itself. In it are discovered (1) a cognitive, (2) a dynamic or impulsive aspect, and (3) an inner or subjective feeling of the worth of the end to which the attention is directed. Interest is the emotional or subjective value which accompanies the self's identification with an end or object deemed necessary to its realization or expression. (For a discussion of the psychology of *interest*, see articles by Professor Dewey and Dr. Harris noted in bibliography of this section.)

(*h*) May it not be contended that, if Herbart's account of the totally indifferent nature of the soul be correct, it is possible for the educator to make out of it what he desires? His psychology is rather the psychology of the 'learning' process than of a human being. If it were strictly true that knowledge is primary, Herbart's theory of virtue or morality becomes simply the Socratic doctrine that knowledge is virtue, stated in terms of a mechanical psychology. To control the individual's action it would only be necessary to furnish the right presentation, and through correlation reinforce this one by allied and congruous ideas in such a way that the focus of consciousness could be maintained by the allied idea-forces. Teaching would thus become a mere matter of idea-instilling, and psychological in-

quiry a search for the mechanism of the process. Through presentation determine mental content; through mental content determine desire; through desire determine activity. The monad soul is at first practically at the mercy of the external world. By multiplying the individual's ideas in the right way you are determining what his desires and motives shall be, and thus his conduct. "I confess," Herbart says, "to have no conception of education without instruction." From what precedes, namely, (1) the dependence of will on ideas, (2) ideas as distinct entities possessing various degrees of force, (3) similar and congruous ideas tending to form alliances among themselves, it will be recognized how necessary for a theory of instruction based upon a psychology of this intellectualistic type is (1) the control of ideas, through orderly presentation (*apperception*), and through reinforcement (*correlation*), (2) the enrichment of the circle of thought through *concentration* on ethical ideas, and through amplification of the educative materials.

Throughout his account of the mental life, Herbart seems to over-emphasize the intellectual aspect, and to under-estimate the significance of activity, feeling, purpose, and habit, and the natural correlating power of the mind based on its original instinctive and impulsive equipment. The doctrine of Presentationism has its foundations in a dualistic theory of knowledge (see account of Kant's theory of knowledge, Chap. III, sec. 5; also Chap. VI, sec. 4.) It undervalues, moreover, the significance of direct, personal experience, and knowledge gained through the exercise of the constructive activities on the part of the learner.

References:

In addition to Herbart's works, see Bibliographies in *Herbart Year Books*, in *Report* of the Commissioner of Education, 1892–93, p. 393; in Rein's *Outlines of Pedagogics* (Van Liew), various articles in *Neue Bahnen*, and in *Pädagogium;* also, Histories of Philosophy of Windelband, Höffding, Ueberweg, and Falckenberg; De Garmo, *Herbart and the Herbartians;* Dewey, *Interest as Related to Will* (Second Supplement to the *Herbart Year Book*, 1895); Harris, *Herbart's Doctrine of Interest*, in *Educational Review*, June, 1895; Ribot, *German Psychology of To-Day*, pp. 24–49; Stout, *Herbart's Psychology*, in *Mind*, Vol. XIII; Tompkins, *Herbart's Philosophy and Educational Theory*, in *Educational Review*, October, 1898; Ward, *Herbart* in *Encyclopædia Britannica*.

Further problems for study:

1. Herbart's relation to (i) Kant, (ii) Fichte, (iii) Pestalozzi.
2. The bearings of the Intellectualistic and Voluntaristic psychologies on educational theory.
3. The relation of interest and purpose to apperception.
4. Herbart's doctrine of Interest.
5. How far is the Culture Epoch theory consistent with Herbart's view of the nature of the soul?
6. Comparison of Hegel's and Herbart's views of mind.
7. The influence of Herbart's 'Pluralism' on his psychological, ethical, and educational theories.
8. The individual and the social in Herbart's ethics.
9. The relation between Herbart's *A B C of Sense-Perception* and Froebel's theory of the *Gifts*.

VIII

THE EDUCATIONAL THEORIES OF FROEBEL

1. While Froebel (1782–1852) never succeeded in giving to his thought the rounded completeness of scientific system which characterized the work of Herbart, nevertheless his educational theories presuppose a more or less definite philosophical creed, the dominant ideas of which were the common property of the romantic-idealistic movement to which he belonged. It is therefore necessary, first of all, to indicate the more important philosophic foundations of his educational doctrines:

(a) *The conception of Reality, or the world, as an organic unity.*—Throughout his work Froebel conceives of the manifold of existence as a single process. His position may be characterized as a humanized Idealism, or a spiritualized Naturalism,—Reality, conceived as a movement of Absolute Life. With Schleiermacher, it is true, he tends to regard the religious conviction of the unity of things as the final guarantee of the truth postulated by philosophy. To any system of atomism which regards a unity or whole as a mere aggregate of its independent parts the thought of Froebel is absolutely opposed. The universe in spite of its multiplicity is one. By itself the world is plurality: at best an aggregate: it is the totality of being, conceived in its differentiation. But it is a universe or cosmos because it has its being in a spiritual principle, in God. Reality is thus for Froebel an organic unity; a unity, *i.e.*, whose differ-

ences are its own determinations. Because of their origin in a common world-ground, all things constitute a living unity; a unity, nevertheless, in which each thing is also an individual, distinct from all others. Accordingly, every element or member of any unity, natural or human, must be evidenced in a twofold way: from the side of its independence, self-sufficiency, and exclusiveness, as well as from the side of its dependence upon the larger whole of which it forms a part.

(b) *The corollary of the first, namely, development.*—The two ideas reciprocally supplement each other. Into Froebel's conception of organic unity enters the thought of manifold elements, individual existences, and activities. To admit such differentiation within unity, implies a dynamic, not a static, view of reality. The reality of the world implies the continuous self-determination of a spiritual principle, and this very self-determination involves the process whereby the world is maintained as an organic whole. By development Froebel understands the tendency of any unity, absolute or finite, to differentiate itself into a manifold while still retaining its unity. This process is found in the plant, in the animal, in the individual and society. Through this process of development the one passes into a manifold: in differentiating itself it individualizes and also realizes itself.

(c) *The principle of activity.*—The end or purpose of each individual life is to realize itself as an element of the larger system to which it belongs, ultimately of the larger organism of Reality. For man, the end is to come into harmonious relation with nature and humanity, and with God, the immanent life of both. This can be attained by him only through the exercise of his own activity or power of self-determination. What the self is to be, it must become for itself.

[For a fuller account of these principles as interpreted by Froebel, see *Teachers College Record,* November, 1903, pp. 16–36. For materials concerning the development of Froebel's thought and its relation to the philosophical and ethical tendencies in the Germany of his day, see translations by Michaelis and Moore of the *Autobiography of Friedrich Froebel,* of Froebel's *Letters,* and of Froebel's *Letter to Krause;* various papers translated in Barnard, *Child Study Papers* (articles by Fichte, Lange, and others); Blow,

Introduction to Mottoes and Commentaries of Froebel's Mother Play; Hanschmann, *Friedrich Froebel* (translated under the title, '*The Kindergarten System,*' by Franks), also, *Pädagogische Strömungen: Eine Würdigung Pestalozzis, Fröbels, Zillers;* Harris, *Introductions* to translations of Froebel's works; Von Marenholtz-Bulow, *Reminiscences of Froebel;* Articles in *Erziehung der Gegenwart;* Diesterweg's *Jahrbuch; Rheinische Blätter für Erziehung und Unterrichts; Kindergarten; Pädagogium* (articles by Dittes and Morf): Encyclopædias of Pedagogy (with bibliographical references) of K. A. Schmid, Karl Schmidt, Sander, Rein, and Lindner; Seidel, *Introductions* to his edition of Froebel's works; Steglich, *Ueber die pädagogische Idee Friedrich Froebels in ihrer philosophischen Begründung durch Frohschammer.*

For the work of Krause (1781–1832) Froebel seems to have had most liking, and from him it would appear borrowed a considerable amount of his technical phraseology. Krause sought to improve upon the pantheism of the system of Identity through his doctrine of *Panentheism*—a philosophy founded on the notion that *all things are in God.* Concerning the relation between Krause and Froebel, see especially Krause, *Das Urbild der Menschheit,* also, *Tagblatt des Menschheitslebens;* also, Eucken, *Zur Erinnerung an Krause;* Hohlfeld, *Ueber Krause und Froebel;* Schliephake, *Ueber Friedrich Froebels Erziehungslehre.* The chief points in which a comparison between Krause and Froebel might be instituted are the following: their views concerning (1) the personality of God, (2) nature, (3) the relation of nature to the Absolute, (4) man, (5) the community and solidarity of humanity, (6) the aim of education, (7) the supremacy of will over intellect, (8) religion as the supreme mode of self-realization, (9) the 'mediation of opposites.' The idea underlying Froebel's conception of *mediation,* while a common possession of the period, was by him derived in part from Krause.

In reading Froebel's *Autobiography,* note the significance of his contact with nature in his personal life, and compare with the *Prelude* of Wordsworth and the *Alastor* of Shelley. For Froebel, as for the youth in *Alastor*:

> "Every sight
> And sound from the vast earth and ambient air
> Sent to his heart its choicest impulses."

Concerning Froebel's attempts towards an interpretation of nature, materials will be found scattered throughout his works, especially the *Education of Man.* No wholly consistent interpretation will be discovered, though many exceedingly suggestive things are said. (1) In certain places an interpretation is given reminding one of the Wordsworthian. (2) But, as Dr. Harris has frequently pointed out, Froebel was not a poet so much as a re-

ligious mystic, and frequently, perhaps most frequently, we find in his works the Romantic impulse uppermost,—to revel in *a content of consciousness* by such as Froebel and Schleiermacher won through *religious* rather than *æsthetic* intuitions and symbols. (3) Sometimes he essays a mathematical construction of nature—apparently because the mathematical were the only sciences which had been given systematic form—as Herbart and others had attempted. (4) Again, he believed that he found the morphological element in *crystallization* as did Rosenkranz in his *Hegel's Naturphilosophie*. Froebel, it is true, recognized with Idealism that the law of thought is the law of the cosmos, but with the Romantic philosophers was, it would appear, unable critically to distinguish between consciousness and its content, and to realize the necessity of an *epistemological interpretation* of the relation and adaptation of nature to mind. Froebel accepts nature as an immediately given reality: Epistemology seeks an answer to the question, *How can it be given to us?* This constitutes a serious deficiency in his philosophy of education. See also section II. On the position of the sciences in the time of Froebel, as well as for an account of various philosophies of nature attempted at the time, see Merz, *The History of European Thought in the Nineteenth Century*.]

2. (*a*) From what was said in the preceding section it will be apparent why Froebel should take as the basis of his psychology the notion of the self or person *as an individualization of the Universal Life or Reason*. This individuality may be modified and developed through education, but never completely changed. From temperament, from introspective study, from the influences of Romanticism and of Idealism which came to him in the spiritual environment of his day, Froebel had developed a profound but somewhat mystical view of the inner depths of the human personality. He found it quite impossible to separate distinctly his psychology from his philosophy. For him, as for Schleiermacher, within each individual there is the capacity of becoming a specific expression of the world, at once *a compendium and a specific expression* of the life of humanity, a microcosmus of the enveloping macrocosmus. The child is to be regarded "as a struggling expression of an inner, divine law," and therefore education in its most comprehensive sense consists in "leading man as a thinking, intelligent being, growing into self-consciousness to a pure and unsullied, conscious, and free representation of the inner law of divine Unity, and in

teaching him ways and means thereto."—*Education of Man*, sec. 2.

(*b*) In every part of nature, life and growth appeared to Froebel as a progressive development from lower to higher grades of being. The essential feature of mind is activity: the ego is not something which must exist before it can put forth its activities. The mind is a process, not a mere succession of states. The development of mind is the gradual manifestation of inner purposes, *not the gradual modification of images and associations through the entrance of elements from without.* [See Chap. VII, sec. 1 (d).] For him, from one point of view mental growth and development are the growth and development of *self*-consciousness and through this development the individual becomes aware of his essence. While this consciousness of self is possible only through and is continually dependent on the consciousness of the outer (nature and society), nevertheless Froebel does not regard the inner (or mind) as externally determined; rather he maintains that through consciousness, the individual may continually emancipate himself from the law of external influence, thereby making the material, or nature, from which his life seems to start, through whose very oppositions and antagonisms he is lifted to a consciousness of himself, and which he comes more and more to make instrumental to his purposes, the very medium for the attainment of spiritual freedom. Froebel, for the most part, insists upon the organic relation between nature and spirit. He does not say that man is merely natural, nor will he admit that man can get along without the natural. As was said above, mental development is for him fundamentally *an unfolding of a system of inner aims* which, instead of merely representing, or conforming to environment, more and more make environment the instrument of self-realization.

(*c*) "If we strive to grasp in a common unity this process of development we find an element which manifests itself in the following forms: (1) as a germinating and developing power, working from within outward; (2) as a receptive power, from without inward; (3) as an assimilative and formative energy, a synthesis of the preceding forms. Thus the pivot upon which all turns is the recognition of life, of *activity*." Froebel, ac-

cordingly, regards activity as the ultimate feature of the mental life. The soul is an activity, influenced by its surroundings and reacting upon them; thereby adjusting itself to an ever-widening environment. Intelligence, that is, perception, memory, thought, is for Froebel (at least for the most part throughout his writings) *instrumental* to the life-process. With the Voluntarist Froebel would maintain that the ultimate basis for the activity of cognition is furnished by the will. (See also section 12.)

3. Froebel never worked out with any attempt at logical precision a theory of ethics or of society. Nevertheless, fundamental to his thought are certain well-defined convictions concerning *the nature of the self, the normal constitution of man, and therewith his relation to the social and moral order of which he forms a part.* Froebel's social and ethical theory is of course a part of his general philosophy of life. It is of the type of ethical idealism throughout. While having its foundations in religion (as with Leibnitz, Lessing, Kant, and Schleiermacher), yet the right and the good are as *autonomous* for Froebel as for Kant. "We weaken and degrade the human nature we should strengthen and raise, when we dangle before it a bait to good action, even though this bait be hung out from another world. In using an external stimulus, however seemingly spiritual, to call forth a better life, we leave undeveloped that active and independent inward force which is implanted within every man for the manifestation of ideal humanity." His ethical and social doctrines have their religious foundations in the conception of *evolution as the revelation of God.* Only in such a conception can we understand the facts of the individual life from infancy to maturity: only on this basis can we appreciate *the fact of harmony and union between the individual and the processes of nature and human history.* The individual soul, nature, and humanity, are interrelated elements in one spiritual process, to be understood only in relation to one another and in the light of the end towards which they seem all to be tending. In answer to the question, How to adjust the individual, who is always implicitly more than a mere individual, to the larger life in which he must move and have his being, Froebel would reply, that human life, and hence the educative process, is possible and intelligible only on the assumption that both the self and the world, mind and

nature, personality and environment, have their origin in the intelligent purpose of one universal, spiritual principle; and only on the basis of such *kinship between the essential nature of the soul and of that wider life upon which the soul enters*, is it possible to render an account of the education of the human spirit.

It was noted above that for Froebel the growth of personality is a process of increasing complexity of individuality through participation in a wider life. On the other hand, for him as for Kant and Fichte, the soul must build its own world, its own representation of the macrocosm. The soul is not a simple resting identity: *it is not something which has activity: it is activity*. For Froebel as for Fichte the life of the soul is a *continual process of activity* through which it attains self-knowledge and self-realization. For both, moreover, as Froebel declares "the true origin of man's activity and creativeness lies in his unceasing impulse to embody outside himself the divine and spiritual element within him." For Froebel, Schleiermacher, and Fichte, again, we may say in Froebel's words, "Religion without work is apt to degenerate into empty dreaming and purposeless emotion, while, on the other hand, work without religion tends to degrade man into a machine. . . . Work and religion are coeval,—as God, the Eternal, creates throughout all eternity." The soul is self-determining, moreover, *in spite of, and yet by means of*, opposition. The opposition of nature and society to the development of the intellectual and moral life of the individual is, however, only apparent. These, indeed, are the means by which this very development is rendered possible. For Froebel, as for Idealists generally, the life of the individual is the process whereby *in knowing the objective world, he learns to know himself; and he realizes himself only as he becomes a part of the life of nature and of humanity as embodied in the great forms of institutional life*,—only as he becomes the agent of a divine purpose to which all things ultimately contribute. The course of the upward movement in the spiritual life, therefore, is one of self-estrangement and self-surrender. Only through a continual process of self-surrender to the life of nature and of humanity does man attain to a consciousness of the latent wealth of the inner life.

4. It will be apparent, then, why the life process of the

individual, and therefore, the educational process, should be conceived by Froebel as essentially a social process with its complementary phases: (1) increasing individualization and self-realization through activity, and (2) increasing participation in the various forms of institutional life, home, school, society, state, and church, in which the mind of the race has manifested itself. For him each one of *the various human institutions constitute at once a system of control, and a medium for the activity of the individual*, specific in function yet rendering to the other complementary and necessary service. "Thus enriching his (the individual's) own life by the life of others, he solves the problem of development." According to Froebel, moreover, the values, habits, norms, or ideals which interpret, organize, and enrich the experience of the individual are socially mediated. They do not get to the individual save as they are mediated by social agencies. To put it briefly, the individual can be educated only in the presence of other human beings. The conception of the educational process as one through which the spiritual possessions of humanity are mediated by the various social agencies, while not wholly original with Froebel, yet in him attained to clear consciousness and reasonably definite statement. While he was never able to work out completely this idea of the mediation of the spiritual possessions, yet he achieved it in a unique way so far as concerns the first six years of the child's life, through his conception of the home, with the mother as teacher, and of the kindergarten, which is through and through a social institution,—an agency for the mediation of experiences by means of the child's characteristic activity in that particular period. It cannot be doubted that Froebel for the most part kept clearly in mind throughout his work this idea of *the educational process as a process of interaction*, a process by which the spiritual experience, the ideal values of human life, are mediated or communicated to the individual. There are places in his writings in which, as will be pointed out in a subsequent section, he seems to abandon this conception for the intellectualistic view, but this is certainly not in harmony with his general position. Here *we must abide by the principle of Froebel's thought*, clearly separating it from the matter of detail or its imperfect application.

For example, in the *Mother-Play*, his 'most triumphant achievement,' it may be noted how Froebel works out the idea of education as a process of interaction between the two factors of the experience-process, society and the individual, represented by the mother and child. On the one side you have the child with its impulses, tendencies-to-things, and tendencies-from-things; to begin with for the most part at the mercy of his environment. The child contributes the impulse, the need, the unformed activity; the mother (who represents the social or normative side of the process) contributes the direction, the habitual form, the value or interpretation. As Miss Blow expresses it, Froebel *sought for the point of contact between the manifested needs of the one and the instinctive effort of the other to meet such needs*. The child and the mother (or what the mother through *thinking love* does for her child), for Froebel in his *Mother-Play*, therefore, are the terminal aspects of a unitary educational process. What Froebel would have the mother do, therefore, is so to correct, organize, and enrich the child's crude but very real experiences, that its experience at any moment may be full and rich and therefore preparatory to a still fuller and richer experience in the future.

(*a*) In a fuller discussion than can be attempted in the present outline of Froebel's conception of education as a process of interaction between the two factors of the *experience*, and thus necessarily of the *educational*, process, (1) society (the *corporate* aspect, represented by the mother, teacher, studies, etc.) and (2) the individual (representing the differentiated, the individualizing phase) there should in justice to him be noted his treatment of at least the following points: (1) The nature of individuality; Froebel's conception of the 'self.' Compare with the views of Fichte and Schleiermacher. (2) Consciousness as belonging "to the nature of man and as one with it." Compare the general idealistic position as outlined in Chapter V. (3) The primitive unity of experience and its gradual differentiation and integration through the natural impulse to activity; the impulse to activity finding expression first of all through a system of natural instincts. Compare the method by which Fichte, Schleiermacher and Froebel effect the transition between *spirit and nature*, the realization of a spiritual principle in

a *so-called* empirical world. For Froebel, as for Fichte, freedom *depends* on activity and reflection, and for both the ethical law is "*each particular action should form part of a series which leads the individual to spiritual freedom.*" (4) The relation of knowledge to will. The tendency of Froebel's psychology is to regard the system of our ideas as dependent upon our impulses and our will. (5) The relation of the individual to institutions. (6) The conception of play as mediatory. (7) The significance of the imitative and play activities. (8) Studies as representing the typical human interests and activities, and the corporate side of human life. (9) The notion that educative intellectual activity is attained through the *definition of contrasts or opposites* demanding mediation and unification, thereby leading to the ultimate establishment of harmony. In the light of preceding chapters it is needless to say that the conception of consciousness upon which this theory of Froebel is based was,—through the application of the organic mode of interpretation consequent upon the failure of the mere logical principle of identity to afford an explanation of psychical life,—a commonplace in the idealistic and romantic philosophy of the period: the conception, namely, of consciousness as an organic unity, an indissoluble unity of opposites. Kant and Fichte had applied the conception in their interpretation of the *structure of consciousness as such;* Schelling and the Romanticists applied it in their interpretation of *the content of consciousness;* Hegel, combining the speculative temper with a realistic interest in nature and history, and attempting to unify consciousness and its content, applied the conception as an expression of the *method* of all spiritual achievement. That Froebel did not completely grasp the conception in its *philosophic implications* is evidenced by the fact that at times (1) with Schelling (*i.e.*, Schelling's later writings), he accepts the position, "the reality of object and subject is strictly coördinate," and at times (2) the Hegelian position, according to which in consciousness is a unity presupposed in and yet transcending the difference between subject and object, mind and matter. The former position leads directly to pantheism and agnosticism, as with Spinoza and Spencer: and it must be admitted that *from the point of view of their philosophy,* in *idea* if not in *spirit,* Froebel and Schelling did not escape the diffi-

culty of merging all differences in absolute oneness. The second point of view, that of *the immanence and transcendence of consciousness*, is the position of theistic idealism,—*undoubtedly the position which Froebel strove to occupy.* Becoming possessed of this conception, *the reconciliation of opposites*, and by temperament and training inclining to an idea which might embrace the educational process in its totality, Froebel made it the constitutive and regulative principle of education. When, with Fichte, he emphasizes oppositions, antagonisms, or a system of limits, as the condition of activity, effort, work, and self-development, Froebel is surely on the right track: but when, with Schelling, he seems to emphasize and define disparates, oppositions, and contrasts (without having afforded a consistent logic of the process of differentiation), apparently to give relief and color to his idea rather than to the reality, he is, to say the least, on dangerous ground. The validity of the philosophical principle which underlies Froebel's doctrine of the mediation or reconciliation of opposites is not here in question. (See *Teachers College Record*, Nov., 1903, pp. 22–23; also compare modern interpretations of consciousness). The problem is rather one of interpretation of the principle, and the critical estimation of *Froebel's use of it as a fundamental principle in educational theory.* Krause made some approach to a logical or systematic deduction of the principle: it does not appear that Froebel recognized the necessity of any such deduction.

(*b*) In a study of Froebel's interpretation of the educational significance of play and games, it would be necessary to note in some detail the following points: (1) His essential originality in his attempts to make play educationally significant. (2) His conception of play as the "self-active representation of the inner life from inner necessity and impulse." (3) Theories of the origin of play. (4) Play as self-expression and as revealing the nature of the child. (5) Types of the play-activity according to Froebel: the play-world of the child as *symbol.* (6) Play in relation to *art* and *work:* the so-called dialectic of play, work, and art. The transition from play to work. (7) The *individual* and *social* significance of imitation. The child's perception of relations, external first of all, then causal. The transition from imitation to originality through the *appropria-*

tion of the principle of the thing or process imitated. (8) Organized play as educative: the *individual* and the *generic* self. Educative significance found in (i) rendering the body the more adequate *instrument and expression of the soul*, (ii) affording opportunity for *the perception of relations*, and thus a means of self-control through the organization of intelligence, (iii) reproducing typical forms of human activity, thereby affording a means of social preparation through the cultivation of social judgments, dispositions, and activities. (See Blow, *Introduction to Mottoes and Commentaries of Froebel's Mother-Play;* also, *Letters to a Mother.* Compare also Froebel's treatment of play with that found in Baldwin, *Mental Development: Social and Ethical Interpretations*, pp. 139–147; Groos, *The Play of Man*, pp. 361–406; Sully, *Studies in Childhood*, pp. 33–51.)

(*c*) In Froebel's analysis and interpretation of the chief groups of subjects of instruction, note: (1) His conception of (i) the continuity of experience, (ii) the differentiation and integration of experience, (iii) social experience as a spiritual organism. (2) Studies as modes of self-realization: processes rather than products educative. (3) Studies as forms of social experience. (4) His attempt to furnish a philosophy or psychology of the subject-matter of instruction; in other words, to indicate the "genesis of objects of study in order to discover the relation of such objects to the nourishment of mind." Science, art, number, language, occupations, plays and games, religion. The *interests* fundamental to his classification. (5) The course of study as the *selected and organized environment of the individual.* (6) His classification of studies in their relation to what Dr. Harris speaks of as Froebel's attempt *to organize a system of education that will unfold the rational self and chain down the irrational.*

5. In the consideration of one or two concrete illustrations of Froebel's theory of education it may be noted that first of all in the *Mother-Play* he appears to have had in mind three fairly well-defined ends: (1) to raise certain of the unconscious habits and activities, or the indefinite intuitions, of the mother into clear and reflective consciousness with a view to the control of the child's experience, and thereby his subsequent growth and development; (2) to indicate *within the experience of the child* an

element of rationality and the capacities and potencies of larger and richer relationships, and therewith a larger and richer experience; (3) to indicate how through simple pictures, conversations, songs, stories, and plays, the mother may present elements of an ideal to the feelings and imagination of the child and thus *consciously* assist in raising it, physically, intellectually, and morally, into harmony with that larger order of which its present experience is prophetic.

6. In the study of the kindergarten as a social institution consider: (1) Froebel's conception of human institutions, (i) the relation of the individual and the social, (ii) the nature of the social unity, (iii) society as a *system of purposes*, (iv) *the social significance of nature*, (v) social participation and increasing individualization, (vi) the relation of social order to social progress. Froebel's conception of the significance of the Family. "At present it is to the quiet and secluded sanctuary of the family that we must look for a revival of the divine spirit among mankind." (2) The *structure*, the specific *function*, and the *reality of the social life* within the kindergarten society. The view of *social organization as centering about activity*. (3) The kindergarten as mediating through its preparatory work by means of play between home and school. Continuity in the mental life; between home and school, between education and life. (4) The function of institutions in the *distribution and transmission of experience*. Compare the conceptions of Fichte and Pestalozzi. (5) Froebel's conception that the educational starting-point lies in the interests, needs, activities of the child, and of education as a process of social interaction (see section 4) through which the interests, activities, experiences of the individual are corrected, organized, amplified, and made significant through the reproduction in the kindergarten society of typical activities and experiences of the wider social life: in other words, that the *law which lives in social life, and the ideal worths towards which the wider social life is struggling*, are to become the law and ideal of the kindergarten society. (6) His notion that *the best play-materials are the children themselves*. (7) The *principles* underlying *the selection of the materials of the kindergarten program*. (8) Froebel's *method* in relation to the ideal of the kindergarten society. (9) Habituation, Imitation and Sug-

gestion, and Instruction, and their respective functions. (10) The social significance of human labor. Compare the conceptions of Fichte and Schleiermacher. (11) The *idea* of the kindergarten and of democratic society. (12) The success of Froebel's adjustment of means to end in his system so far as he worked it out. (See Gilder, *The Kindergarten: An Uplifting Social Influence in the Home and the District*, in *Proceedings N. E. A.*, 1903; Harris, *The Kindergarten as a Preparation for the Highest Civilization*, *Proceedings* of the *International Kindergarten Union*, 1903.)

7. In the organization of the system of Gifts and Occupations Froebel seems to have had in view at least three fairly distinct ends: (1) Through the knowledge of their form, size, and number,—according to Froebel the characteristic qualities of all material objects,—to have the individual gain a comprehension of, an intellectual mastery over, the objects of the physical world. As Miss Blow expresses it: "The material used by kindergarten children for their productions has a geometric basis and is organized to illustrate numerical ratios. Becoming familiar with spheres, cubes, cylinders, circles, squares, oblongs, triangles, indeed all geometric planes and many geometric solids, the child learns to recognize them in the objects around him, while by constantly applying he is prepared to observe numerical relations. Since all form rests upon geometric archetypes, and all inorganic processes are governed by mathematics, the child's experiences with form and number give him the clue to inorganic nature. . . ." Furthermore: "The total series of the kindergarten gifts must illustrate in the evolution of geometric forms the general law of advance from an undifferentiated unit to those highly complex wholes wherein the most perfect unity is achieved through infinite differentiation and integration. For this reason the kindergarten gifts move from the sphere conceived as excluding to the sphere conceived as including all possible faces, corners, and edges, and to this movement of solid from sphere to sphere corresponds the evolution of geometric planes wherein the circle is both the terminus *ab. quo* and the terminus *ad quem* of a generative process, and the movement of lines from the curve will return thereto through the intersection of straight lines of different

inclinations. Each solid, plane, and line is therefore apprehended not in detached and solitary independence, but as an integral member of a related series. The exact place of each solid in the series is determined by its greater or less approximation to the sphere, the exact place of each plane by its greater or less approximation to the circle. The primary purpose of this organization of the kindergarten gifts is to lead toward the apprehension of all single geometric forms as members of an ascending system." (Compare the attempts to indicate how a *quantitative* mastery may be gained over inorganic nature made by Pestalozzi and Herbart.) (2) As a symbol of the development of self-consciousness, the common method of which Froebel conceived, as was noted above, to be a progressive mediation of opposites. From the point of view of educational material this common principle of mental development demands according to him the presentation to the individual of contrasts or opposites in form and their gradual elimination by means of intermediate series. (3) Through the self-active representation of typical (a) *life*, (b) *knowledge*, and (c) *beauty* forms to have the child's experiences organized and enriched in such a way that they are given not merely a meaning or a value but also that they become more and more under control, and the child becomes less and less at their mercy.

It is needless to say that Froebel's entire system of Gifts and Occupations is based upon a recognition of the motor character of consciousness. "Thought must clear itself in action and action resolve itself in thought." His aim was, undoubtedly, to maintain a balance between the intellectual and the practical. The child, he argues, makes or receives a plan, and then executes it; has a thought and embodies it in concrete form. It is interesting also to note in many sections of his writings the degree to which Froebel recognized the reaction of physical conditions upon conscious states. (See, *e.g.*, *Mottoes and Commentaries of the Mother-Play*, English translation, p. 167–171.) His purpose in the Gifts and Occupations, then, from one point of view, might be said to be to secure or maintain a balance between the cognitive or intellectual and the volitional or practical aspects of the experience of the individual. As experiences for the child it is fair to say that the Gifts and Occupations are, according to

Froebel, primarily doings, activities, media for active, motor expressions through physical organs, eyes, hands, and the muscular system in general. But this very activity, Froeble claims, involves observation and attention, imagination, planning, thought, in order to the successful realization of some end. The materials are flexible, easily provided, and afford a stimulus to the growth and interplay of ideas, their increasing control, and continual embodiment in some form of activity. In addition to the argument concerning the value of the Gifts and Occupations, namely, that they aim to maintain a balance between the cognitive or intellectual and the practical sides of the experiences of the child, it should be conceded further that so far as Froebel in the Mother-Plays, and the Gifts, Occupations, and Games endeavored to have typical modes of human experience reproduced in the school, he was certainly on the track of one of the most fundamental and fruitful ideas in the entire course of educational theory. Over the working out of the system of Gifts and Occupations Froebel spent fifteen years. What he was trying to discover was the *relation of these materials to the nourishment of mind.* The principle, not the matter of detail or imperfect application, is the element of permanent significance and value. It is in the light of his fundamental principles that justification is found for Davidson's contention that "all future education must be built upon the foundation laid by Froebel." (See also sec. 11.)

8. In the consideration of Froebel's conception of symbolic education, note (1) the natural tendency towards symbolism of Froebel's mind and of the period, (2) the new conception of *the relations of the natural and the spiritual worlds*, (3) the nature of the child's mental imagery, (4) the mental tendency to unify in a "world," by means of symbols, the manifold of sense, (5) the tendency to interpret one experience by another, (6) *self*-consciousness and *objective* consciousness, (7) the symbol as a *self*-projection, (8) the symbol as based upon analogy, (9) the symbol as an approximation to the universal or type, (10) the symbol as mediatory of *social experience*, (11) the symbol as mediatory of the *technique of civilization*, (12) cosmic symbolism: the microcosm and macrocosm. *Nature as a divine sense-symbolism adapted to the use of man.*

9. In Froebel's conception of religion as affording the truest "world-view," and therefore, as *the fundamental disposition governing the individual's participation in the spiritual life of humanity*, and modifying the development of that life, note (1) its relation to the view of Schleiermacher. The *content* of the religious consciousness. (2) Emphasis of *creativity* as the fundamental attribute. (3) Religious interpretation of nature. (4) Religion and morality. (5) The religious element in the child-consciousness. The feeling of community. (6) Stages in religious development. (7) The religious motive. (8) Confirmation of philosophy in religion.

10. "The duty of each generation," Froebel once declared, "is to gather up the inheritance from the past, and thus to serve the present and prepare better things for the future." The essential question concerning any work is not, True or false? but rather, How much of truth has been brought to light, however inadequate at times its expression may be, and however imperfect the attempt has been to render its assumptions intelligible? Criticism of such a nature should enable us to attain a more satisfying because a more discriminating adherence to the thought of Froebel and to do full justice to it without enslaving our own. In attempting to interpret the permanent significance of Froebel's thought and work it is necessary to keep in mind certain general considerations: (1) His thought does not exhibit a systematic or logical unity so much as a unity of tendency and endeavor. The most interesting and valuable things in the life of an individual are his ideals. It is the motive, the informing purpose, that gives its consecration to life. Froebel's thought was, in its movement, essentially experimental and genetic. His theories were only gradually developed through his own life and writings. In many of his works, as he acknowledges, he was "breaking a path through unexplored regions of experience," and he recognized that his success "must necessarily be partial and imperfect." (2) In the study of his theories as developed by himself it is very often necessary to distinguish clearly between the principle and the matter of detail or particular application. (3) Only those principles may be accepted as of permanent significance which receive their justification in reason and experience. Methods of interpretation

and criticism based upon the *reconciling principle of development*, a principle underlying the thought of Froebel as well as that of the period in which his life was passed, and which constitutes one of the permanent achievements of its intellectual life, should enable us in the present to do justice even to the errors of the past and furnish a standard whereby to separate the permanent from the transitory, the spirit and the principle from the matter of detail or imperfect application. Such a principle of development is as hostile to an unwise conservatism as it is to a dogmatic criticism or overhasty reaction.

In an account of the permanent significance of Froebel's work for the theory of education there should, if space permitted, be emphasized the following points: (1) The conception of the theory of education as ultimately a philosophy of life. Education implies a theory of the proper conduct of life, and this, in turn, implies a theory of life based upon an examination of the nature of man and his place in the system of reality. The subject-matter of education is therefore as much an integral part of reality as that of any other science. For Froebel the purpose of education is one with the supreme purpose of life. Our conception of *becoming* is determined by our idea of the reality which underlies the process. Froebel's general position is that spiritual monism which conceives material and mental evolution as continuous phases of one spiritual movement. From the level of inanimate nature to that of human history it is one spiritual reality which manifests itself. The law, therefore, which reigns in nature, and the purpose revealed in human life *must be taken into the consciousness and made manifest in the life of the individual.* Education, accordingly, consists "in leading man, as a thinking, intelligent being, growing into self-consciousness, to a pure and unsullied, *conscious and free representation of the inner law of divine unity*, and in teaching him ways and means thereto." One cannot fail to be struck by the intensely moral tendency in all Froebel's thought. He regards all things, all processes, all materials, ultimately from the moral point of view. In this he is the disciple of Fichte and Schleiermacher rather than of Schelling. On the other hand, however, Froebel's interest is not ethical merely; it is every-

where and always deeply religious. In true religion he finds, with Schleiermacher, the foundation and final guarantee of the facts of the moral life. He maintains that in man, in virtue of the divine principle in him, the consciousness of God is bound up with the consciousness of himself: and if the Absolute be not manifest and revealed to us in the reality we know, it is for us nothing. It is questionable whether the true significance of Froebel's work can be understood until the religious motive fundamental to it all is fully recognized and appreciated. (2) A second point in Froebel's work which should be emphasized is his perception of the *social bearings* of the problems of educational theory, his recognition that a rational theory of education is related in a fundamental way to the spiritual interests of society. Froebel was ever alive to the need of keeping his theories close to practice, recognizing that ideas which have little or no relation to life, but stand apart from it, are self-condemned. However inconsistent at times Froebel's thought may appear, it must not be forgotten that it is insight rather than exactitude in thought that tells most powerfully on human life. (3) A third feature of Froebel's thought which should be noted is his emphasis upon individuality. For him the *tendency to individuation* is the unconscious or conscious tendency of every finite thing. For Froebel an *individual* is essentially a *creative* entity: *it is what it can do*, and where there is no activity there is no being,—no reality. In man, as in the things of nature, is a manifestation of the divine essence, a manifestation which necessarily attains to higher expression and fuller consciousness. Although dependent upon nature, upon humanity, upon God as much as the stone by the wayside or the beast of the field, yet man's dependence is of a different character. The divine life expresses itself in man not simply as existence, or nutrition, sensation and impulse, but in desire, in the knowledge of nature, in sympathy for things human, in the creation of the beautiful, in aspiration towards the good. By the presentation (*Darstellung*) or realization of the individual life, therefore, which Froebel identifies with the educational ideal, he means the evolution of the spiritual nature of the individual, the development of conscious self-determining activity in conformity with the law or purpose immanent in all

things. In virtue of reason man can organize the objects and beings about him into systems,—*nature* and *humanity*,—and gradually rise to the unity of essence and manifestation, of inner and outer, and the recognition of God as the immanent life of both. (4) While emphasizing the right of the individual to development, Froebel, with Hegel, clearly recognized that only in the spiritual community of human institutions, the home, the school, society, the state, the church, does the individual attain true selfhood. The individual in any stage of his development is an organism in the larger organism of life. The center of Froebel's educational theory is the thought of the individual, but the individual regarded from the twofold point of view, as a partially independent unity, and as part of a larger whole. To keep these two aspects in view was one of the problems upon which his mind was most completely set in the working out of his educational ideas: to balance the notions of self-realization and of membership in a more inclusive unity. His thought is perhaps more adequately expressed by saying that the individual at any state of his existence is in a process of organization or unification. (See Butler, *Status of Education at the Close of the Century*, in *N. E. A. Proceedings*, 1900; Dewey, *The School and Society;* Harris, *How the School Strengthens the Individuality of the Pupil*, in *Educational Review*, October, 1902, Howison, *On the Correlation of Elementary Studies*, in *Report of Commissioner of Education*, 1895–96.)

Other conceptions which form integral elements in the thought of Froebel and which can here merely be named in briefest form are the following: (1) The conception of the unity and continuity of (i) mental development, (ii) educational factors, (iii) educative materials. (2) The demand that the doctrine of principles direct its attention not to cognition by itself, but to the activity of psychical life as a whole. The standard of attainment is not therefore intellectual, but spiritual. (3) The conception of the educational process as possible because the self and the world are not mechanical disparates but rather elements in one organic spiritual process. (4) The attempt to work out a systematic plan for the upbuilding of experience in harmony with the idealistic view of consciousness as a self-active principle in the creation of an intellectual and moral

world. The conception of man not as mere knower but as worker. (5) Education as a *process of social interaction.* The work of the mother in the education of the child. Froebel planned for parents and teachers as well as for children. The kindergarten as a society of children, engaged in play and its various forms of self-expression, through which the child comes to learn something of the values and methods of social life, without as yet being burdened by too much of intellectual technique. The education of the individual conceived as growth in freedom (personality) through the organization of interests, purposes, activities into a *system of life.* Education is a process of mediation between the individual and the law or comprehensive order of things (natural and human) in such a way that the law lives in the individual *not as constraint but as nature,* and he only is truly a *person* whose impulses are conformed to the law of all life. (6) The idea of education through processes rather than through products. (7) The significance of the principle of imitation in the upbuilding of experience. (8) The conception that education by development demands the closest conformity of the education to the nature of the individual. For this reason it must closely follow the child-soul through all the successive stages. The primary aim is to awaken and to stimulate the innate principle of life in its development according to eternal laws. It is the mother upon whom, first of all, this duty devolves: the home thus becoming invested with a deep and far-reaching significance as the first seat of culture. (9) Psychology of educative materials. The educative significance of play. (10) The kindergarten as a social institution. (11) The educative significance of nature. For Froebel the phenomena of nature are not expressionless. They possess a language, visible and audible, which their mere reduction to law does not wholly exhaust, but is disclosed to the feeling, to the intuition, to the *wise passiveness* of the soul. (12) Religion as the fundamental disposition governing the individual's participation in the spiritual life. (13) His insistence upon service as the goal of education. (14) His vindication of the sacredness and original soundness of human nature. (15) The conception of life in its entirety as one great educational opportunity, and of the various institutions, home, school,

society, the state, the church as instruments in the realization of this larger human culture.

11. In illustration of the difficulties which Froebel encountered in attempting to formulate his educational ideas there may be mentioned his strange terminology, in the use of which he was influenced by Krause; his lack of literary form; "his absurd etymologies; his lapses into artificial symbolism; his puerile analogies and formal allegories." There are, however, more serious difficulties in his thought, difficulties which seem to lie in the way of an indiscriminate acceptance of his as *a thoroughly consistent and satisfactory theory of education*. Certain of these difficulties should be briefly referred to:

(*a*) It was admitted above that Froebel never succeeded in giving to his philosophy of education the rounded completeness of scientific system. In Herbart we find the trained philosopher, thoroughly alive to the need as well as the nature of system, and anxious according to the custom of his day to show the educational implications of his general philosophical theory. It is but natural, therefore, that Herbart's educational doctrines should be given to us in a highly organized form. Froebel, however, resembles Herder, Schelling, and the Romanticists generally in his inability to keep his poetic, his philosophic, and his religious ideas apart. Logic, ethics, psychology, epistemology are all fused together by him, as so often by Plato, in a semi-religious synthesis. The philosophic spirit and a large measure of philosophic insight were his, but not the power of philosophic exposition or of selecting an adequate vehicle for the transmission of his ideas. Much of his thinking is the outcome of the true Romantic impulse to revel in a content attained through intuition and symbolism rather than as a result of critical reflection. The natural trend of his mind was rather in the direction of great symbolic intuitions than of the somewhat arid ways of critical analysis.

(*b*) Permeating Froebel's conception of the educational process and the educative materials are lurking certain ideas which not only endanger, but which to all appearances are in flat contradiction to the monistic view of reality upon which his general philosophy is based. It was implied in preceding sections that the position of idealistic monism affords on the whole a more

satisfactory basis for a philosophy of education than does pluralistic realism, and chiefly because *Realism* while conceiving the Absolute not as one but as many *independent realities* asserts the possibility of their real communion with one another. Idealism (and this is in harmony with the doctrine of evolution) asserts that it is impossible to view man and nature, the social and the natural orders, as isolable in any other than an ideal way. In this, moreover, Idealism is supported by indubitable facts connected with the evolution of the religious and the æsthetic consciousness, of the sciences, and of the commercial and industrial evolution of society. The question, then, to be asked concerning the thought of Froebel is this: Is the dualistic conception of the individual's environment, nature and humanity, presupposed throughout his interpretation of studies and in the gifts and occupations, consistent with the general philosophical position fundamental to Froebel's system, and, if it is not consistent, does it furnish us a philosophical and unitary principle by which to determine educational materials? With Kant, Froebel seems still to accept a dualism between mind and nature (nature, as physical environment, or so-called objects in space apart from mind). According to the idealistic monism underlying his thought *nature is not something which merely encompasses or surrounds man or society in a mechanical way;* it is something which enters organically into the very makeup of human life. Nature without man is blind: man without nature is an impossibility. Nature and man are not two entities,— a belief from which Kant never entirely freed himself,— but terminal aspects of one spiritual process. Nature, then, in the philosophical and ethical sense means for idealism the processes and materials, *not which lie beyond or external to social life*, but which *essentially and organically condition it.* In the educational sense, nature means the realization (as *worths*) and comprehension (as *means*) of these same processes and materials. To admit that in educational theory this separation of mind and nature is a matter of no importance is to deny the significance of Idealism for educational theory, and to forfeit the benefits to be gained from the attempts of Aristotle, Kant, Fichte, and Hegel to reconcile the apparent opposites, mind and nature, soul and body, freedom and law, natural inclination and moral

effort, mechanism and teleology, nature and culture, as stages through which the spiritual order is realized. (See also the general discussion of the Kantian epistemology, Chap. VI, sec. 4.)

(*c*) The results of the same dualistic tendency in Froebel's thought may be noted in a slightly different form in seeking an answer to the question, Has Froebel adjusted in a satisfactory way his threefold conception of the Gifts (to take these as typical), first, as the medium through which the individual comes to an intellectual mastery of objects in space; second, as divided into the *life, knowledge,* and *beauty* forms, a distinction at times *approaching a separation analogous to the divisions of the faculty psychology;* third, as *mediating* to the individual *typical forms of social experience?* In seeking an answer to this question it is necessary to keep in mind several factors which are, in reality, implicit in Froebel's general philosophical position: (1) The *continuity of development.* (2) Froebel's demand that we are to "give to each stage that which the stage demands." (3) The need of *educative* as well as mere *disciplinary* activity. (4) Without *the relation-giving action of mind* there would be no objective-world. (5) This relation-giving function is *not merely individual but social.* (6) The fact that *the conscious distinction between man and nature is itself the result of a process,* arising only through later reflection, and that *the young child is not yet prepared for the specialization or isolation* (of norms, ends, and values, on the one side, and of the processes or materials through which these norms, ends, and values are realized) demanded by the divisions between man and nature. (7) The fact that *the child's life goes on in the medium or environment of society.*

To a degree, then, in Froebel's interpretation of the Gifts and Occupations the old dualism of mind and nature still seems to persist. Alongside this dualistic conception is one more in harmony with the idealistic psychology of Fichte and of modern idealistic psychology generally,—a conception, however, which Froebel did not always consistently maintain. The more important characteristics of this position may be indicated in some detail, in order that we may have a standard by which to estimate Froebel's actual achievement:

(a) The conception maintains a *functional* view of mind, *i.e.*,

in the wider sense, namely, that the mind is *no isolated entity:* it is not something which has activity; it is activity. We no longer speak of *mind and its faculties*, of functions and that which has functions. The mind is real only in its activity, or rather, *its activity, its functioning, is its reality.* The mind or self is activity operating *in intrinsic relations to social situations*, to a larger social order (*i.e.*, social in the widest as well as the narrowest sense). The general position of the view of the soul as thus conceived is that in determining what consciousness is recourse must be had to an examination of *what consciousness does.* It attempts to escape the extreme positions of both (1) Empiricism, according to which the mind is conceived as a product rather than a principle, and of (2) Rationalism, which in one form or other conceives of the soul as a pre-existing spiritual entity, endowed with capacities or faculties, *prior to the exercise of such faculties or capacities*, existing behind these as a kind of (transcendental) substance or substratum, and before the objective world has as yet disturbed the pure unity of its essence. The view of evolutionary-idealism is not that the mind is mere product or epiphenomenon, nor a mere transcendental spiritual substance which (so far as actual experience is concerned) is a pure abstraction, but that it is *a concrete specific activity constantly directed to the accomplishment of something* and not only the bearer of the experience process, but an efficient agent in its furtherance. From this general conception it follows (1) that in the mental life, as an organic unity, consciousness cannot (without a complete departure from reality) be abstracted from its relations. Prior to and apart from objective experience consciousness is an illusion. It will thus be apparent how necessary it is in the analysis of experience to keep in mind its organic unity: in other words, the organic relation between consciousness and its object, *the agent and the situation or conditions in which the activity proceeds.* (2) That just as the life elements, organism and environment (compare the act of breathing, which is a functional coördination of the lungs as organ and air as environment), so the mental life is a continuous coördination or functioning of two elements, self and environment. Herein we see the difficulty in the Empirical and Rationalistic position. Just as some biologists would

identify function with organ alone, making environment purely external, or with environment alone, making the organ simply product, so the Empiricist would make the self a product and not a principle, while the Rationalist would make the soul a principle existing prior to its contact with the objective world, and, at most, maintaining only incidental relations with the latter. On the other hand, the evolutionary view of mind maintains that the relation of consciousness or self to objective experience or environment is absolute and intrinsic. An isolated consciousness is no consciousness at all: it is a self-contradiction. (3) Since the mental life is not the outcome of a predetermined self upon an external environment, or of the adjustment of the self to a predetermined environment, neither the self nor the environment are eternally fixed in themselves, but both change in the movement of the life-process. In the functional movement of the mental life both the self and the environment are modified and determined. Both are essentially transitional, in a continual process of becoming. The self is real in so far as it continues to act, to become, to progress. (4) Self-consciousness is not a subsequent or higher growth of consciousness, but in rudimentary form at least is a quality of all consciousness. It is consciousness with the emphasis on the subject rather than the object, the agent rather than the situation.

(b) Sensations and ideas are not ends in themselves: they are, so to speak, clues or stimuli in directing activity. All knowledge involves both percepts and concepts, sensations and ideas and their combination. These may be discussed from the point of view of (i) origin, (ii) content. (1) *Sensations:* (i) The biologist maintains that the organs of sense had their origin in the problem of the life-process. Such variations as were of service in the life-struggle were selected; others, offering no positive contribution, were discarded. The sense-organs were thus in their origin organs of adjustment, methods of economy; through natural selection their increasing perfection meant more perfect adjustment, *i.e.*, increasing self-maintenance on the part of those possessing them. Thus, *biologically, the knowledge mediated by the sense-organs had its origin in the needs of the life-process;* it was *an instrument of control,* in securing food or

escaping danger. (ii) In the child again, activities in the form of inherited instincts and impulses precede sensations. His characteristic is impulsiveness; he is essentially a motor being. The child's curiosity is preparatory to some activity, a prelude to behavior. It is ever in the interest of some experiment on the part of some bodily organ, usually the hand or mouth. For him, *the objects of his environment are the particular activities which they suggest and distinct sensations are the sensible news of his behavior.* (iii) In the adult consciousness, likewise, the sensation is a sign, and has significance only as part of a larger whole. When do we have sensations? Examine such experiences as taking the car, looking at your watch, the clock's ceasing to tick, walking over an unaccustomed road, moving the ears, etc. It will be found in such experiences that *sensations either regulate activity, or are signs within the experience circuit, i.e.*, the retrospective reference; or, through their appeal to attention, *they furnish the materials of a new problem, i.e.*, their prospective reference. (2) *Ideas.* Only a very brief outline can be made in this connection. The concept or idea, as is true of sensation, has a retrospective as well as a prospective reference. It is (i) *a register of past experience*, a habit, a method of ordering sensations. On the other hand, an idea embodies (ii) *a plan of action.* Its function within experience is *not only to organize experience, but to institute or furnish the method of future experience.* Its function, therefore, is essentially mediatory, instrumental. Thus the definition of *idea* is in terms of its function, of its position in the movement of experience. It is the instrument of the growth of experience from the less rich and less definite to the richer and more definite forms. To illustrate, take the judgment, *The pencil is sharp. Sharp* is an idea, but *sharpness* does not exist in reality; only as a quality, emphasized within, or abstracted from experience. Why, then, form the 'idea' or 'concept' of that which does not exist? Simply because the idea, so emphasized or abstracted, will furnish a sign, a plan, a method of future action. The idea 'sharp,' then, is ultimately instrumental to a larger experience process, *e.g.*, that of writing. Ideas, then, in providing a method or plan of action *make for economy within experience*, enable us to anticipate and thereby *control future*

experiences. They are thus constructions of the past and of the future. Herein is their kinship with science. Ideas are plans of action. Laws of science are constructions of the past and future behavior of those realities with which man has to deal. Ideas and sciences are thought-constructions for the registration and control of experience. Sensations, ideas, science, are thus seen to be *regulative and mediatory in the conduct of life.*

(c) *The child gets at nature through human life, through a human medium.* Its approach to the world, its normal study of it, is teleological. This conclusion of philosophical idealism, namely, that nature and civilization, matter and mind, body and soul, are not self-subsisting, isolated entities (or at best only mechanically related), but are rather complementary phases of one spiritual movement, seems to be confirmed in a unique way when we turn to the interpretation of any one of the great lines of human interest and endeavor. Only the barest suggestion of such lines of possible inquiry and confirmation can be given here. It will be noted how in sympathy they are with the thought of Hegel and the spirit, *if not always the letter, of Froebel.* (1) The religious influence of external nature has in almost every age coöperated in producing in man the belief that within or behind so-called material things there is a spiritual reality. Idealism finds in the great, historical religions a striking confirmation of its own central position that the universe of nature, though for purposes of description, distinguished as material, is fundamentally a manifestation of spirit. Through countless generations, then, nature, working in and through the religious consciousness, has exercised a unique influence in the education of the human soul. (2) Another striking confirmation of the idealist's contention of the ultimate kinship and, hence, possible community between man and nature, might be found in tracing the growth of man's æsthetic interest in nature, in what is sometimes called the poetic interpretation of nature. Just as through science nature is seen to be interpenetrated with rationality, so through art and poetry in their process of idealization has it been shown to be suggestive of moral and æsthetic values. (3) Through the development of economic and industrial life in modern times the dependence of man on nature in the realization of his purposes and the perpetuation of his

experience is being more and more acknowledged and understood. Industrial and commercial life are forcing upon the mind of man a newer and higher teleological interpretation of his natural environment, and proving to him how completely human life and progress are involved in the subjugation of nature. (4) Science, again, and Idealism meet on common ground. Science rests on the belief that there is a correspondence between the course of nature and the mind of man. This faith is its presupposition: the establishment of the correspondence is its goal. The sciences so far developed are an evidence of the affinity between *the intelligence of man and the intelligible order of nature.* It is only necessary to refer to its history to show in what manifold ways, though through a discipline both severe and prolonged, the struggle for scientific knowledge has been fitted to discipline the intelligence and the moral nature of man.

It was said above that *the child gets at nature through human life, through a human medium.* In the process the child contributes the activity (at first instinctive or impulsive); society (nature and humanity) contributes the situations, the norms, *the system of purposes.* (Compare the positions especially of Fichte, Schleiermacher, and Hegel.) A further illustration of the organic connection between what Froebel designates the inner and outer may be given in a consideration of the teleological relation of mind and body. With the idealism which Froebel strove to appropriate it is assumed that the essence of being is one in kind, and spiritual. Between mind and body there is no essential antagonism or opposition. The mind is no fixed entity separable from matter. If we are to trust our experience matter cannot be as foreign to consciousness as is ordinarily believed. If the analysis made above be true, mind and matter, soul and body, are terminal aspects of a unitary, living, spiritual experience, organic throughout, and in which the so-called nervous system, body, or matter, is instrumental, the machinery of its growth, and of its expanding life. Many look upon the physical as something set over against the spiritual, something that restricts, confines, enslaves. According to the view expressed here the physical, with its senses and stimuli, is the very means whereby we gain freedom. The child, feeling the pain from

the finger thrust into the flame, and thereby restraining itself afterwards, is not limited by its bodily senses or its nervous system. Rather is its nervous system the very instrument through which its freedom is gained. Moreover, just as the body, and nature itself, are instrumental to the self, and no mere hindrance, in like manner is the machinery of institutions no mere hindrance, but the very medium of escape for the individual from the domination of mere instinct and impulse to conscious self-determination. No adequate statement of freedom as a ready-made faculty or power of mind can be given in a paragraph, if at all. Yet when we take the so-called physical and institutional life, not as mere external and antagonistic opposites, but rather *from the teleological and instrumental point of view*, we may realize more fully the significance of the most apparent and the most fundamental fact in experience, namely, that the consciousness of self implies the consciousness of the not-self, and grows with it, and by means of it. Thus conceiving the self and the world as the terminal aspects of a living organic reality or experience and communicated to us (through consciousness) in inseparable correlation we can regard neither one as a resultant of the other. Together they constitute a functional manifestation of a unity which is their common and absolute ground. What, then, is enforced in this section is the impossibility of conceiving a soul or mind in itself, a pre-existing entity, or of matter in itself, a self-contained existence. Keeping by experience we recognize that subject and object are never met by us apart. They are distinctions within a unity, but not different or antagonistic entities. And it scarcely need be remarked in passing that the doctrine outlined above is neither *materialism* nor *subjective idealism*. It is an attempt to construe teleologically the relation of mind and matter, self and not-self, the individual and institutions, without obliterating their differences nor reducing one to the other; securing the reality of both in a life whose variety is unity and whose essence is spiritual. The ultimate reality of the finite self *lies in its meaning* (its functional relation and activity) *not for itself alone but as part of the entire system of Absolute experience* (so-called physical, social, etc.). To begin with, the self is an organ that through its endowment of consciousness may erect itself into

membership in the organic, spiritual system of universal experience or activity, which in turn is to be conceived as necessarily differentiating and expressing itself in the growing life of its parts. If the Absolute is conscious life, it must also be social. But a "society" is not a mere aggregation of parts: to say that it is an organism is to assert something quite different. Accepting the view of reality as an organic and self-differentiating unity, the finite self in its experience declares itself as a fundamental differentiation of this reality. Just as in the physical organism (only the imperfect approximation of a true organic unity) the various parts or differentiations, in a sense, have within them the content of the whole, so selves or persons, as fundamental differentiations growing into self-consciousness, have potentially within them the content of the entire organism of reality, though of course not in the same way that the organism itself contains it. In himself the individual self is naught in union with the whole of reality everything is potentially his. As a spiritual being, therefore, there is nothing which may be regarded as the individual's exclusive possession. He shares, participates in a common life. This is the community of the spiritual life. From first to last the life of the individual is a shared life, a life shared with nature, and human beings. *But with these it is shared. They are not its origin.* In the attempt to account for the origin of the individual, as a spiritual process of experience, we are ultimately forced to regard this process of individual life as a process of realizing the universal experience through itself. Human experience thus becomes a progressive acquaintance with and adjustment to Absolute Reality.

(*d*) In viewing civilization as the progressive articulation and realization of human nature which still persists in the spiritual experience, the intellectual interests, the habits of conduct of the present, it is assumed that (1) the most satisfactory psychology of race-development is a psychology of action: The ultimate social fact is "*men acting together for the sake of interrelated ends.*" These ends may be protection, wealth, worship, what not; man's ever-increasing wants rising into desires and his perpetual efforts to satisfy those wants. But back of this notion of men in functional relation to one another and to their environment we cannot go. The history of civilization is the

history of human achievement. (2) The conditions or materials of human activity are *nature*. Civilization is ultimately possible because man and nature are not isolated entities, but rather phases of one spiritual movement. In a very real sense the direct influence of nature upon man is greatest when he is in *the primitive stage of development*. In the process of social evolution through institutions, the growth of knowledge, the increase of tools and inventions, there is developed a psychical medium through which the direct physical influence of nature is humanized and mediated. Nature, from the physiological point of view, does still influence the individual directly: but psychically or educationally nature's influence is mediated through the process of social life of which the individual throughout his career is a member. From the beginning man has been in some kind of functional relation to his environment. His life has presented itself to him as a series of problems to be solved: and these problems are social as well as individual. Man's achievements are social achievements and have therefore been brought about by some form of social action and coöperation. It may be said, then, that *civilization*, or *culture*, represents the values, norms, ideals; *nature* is the processes, materials, the means of their realization. It is the methods discovered by man in the course of his experience for the registration, organization, control, and perpetuation of his experience. It has thus a retrospective as well as a prospective aspect. In civilization, therefore, *as the organization of human life thus far attained*, there are certain fundamental methods or norms which are inherent in its natural constitution and which reproduce themselves in all its manifold forms. In the analysis of these normative elements, Science, Language, Art and Literature, Institutions, and Religion, these must be continually viewed as inter-related aspects of a common social experience or activity: they are the general elements of civilization,—elements which constitute *the real existence of the concrete and organic unity of society*. Each of these elements has its retrospective and prospective reference: each represents a fundamental habit and accommodation in the life of the race. All together they are functional elements within the social process, mediating agencies in the communication or transmission of experience, instrumental

to the spiritual life of man. The evolution in nature and in civilization has its goal in the elevation and expansion of the personal life. It will thus be recognized how necessary to any adequate statement of the "Course of Study" is a chart of civilization,—a morphological or psychological presentation of the *great methods or norms according to which human experience has been organized, elevated, and expanded.* Adequately to state what science, art, and religion mean in the movement of the individual's experience, it is ultimately necessary to trace their significance in the movement of the spiritual experience of the race.

12. If the foregoing be a fair, though brief, statement of the position of evolutionary idealism it will be possible to discover just how far the position of Froebel coincides, and wherein his system tends here and there to diverge from or wholly abandon the conception which seems to the evolutionary idealist to be along the way where truth lies. The important questions, then, to ask concerning Froebel's treatment of studies, and perhaps especially of the gifts and occupations, are these: (1) Do they, in any way, force upon the child *a distinction* (between man and nature, or between man and social life) *which is the result of later reflection and abstraction*? (2) Does Froebel, and to what degree, divorce *sense* or *thought training* from the normal system of activities and purposes,—*activities and purposes in which alone sensations and ideas gain their significance*? If such be the case, such training must ultimately become mechanical and valueless educationally, producing, indeed, what Dr. Harris speaks of as arrested development. What is to be our standard of sense and thought training? If we accept the *voluntaristic*, or evolutionary-idealistic position, it follows that for the child there must be a *motive to activity*, an outlet beyond itself,—a motive which forms part of a teleological system. Do the Gifts and Occupations (to take them as typical) always provide a motive sufficient to make the activity of the child significant? (Compare the criticisms which have been made on the formalism of the Kantian Ethics, and his complete separation between reason and desire.) Does Froebel in the Gifts and Occupations, to any degree, return to the *intellectualistic* position from which he was attempting to get away? Does Froebel introduce pre-

maturely the technique of certain activities apart from their relation to or significance or function within the child's experience? Is his analysis of the Gift, for the most part, a logical or psychological one? Is it made from the educator's or from the learner's point of view? The psychology of a gift, occupation, or study, implies the interpretation of the experience, for which the gift or study stands, from the genetic point of view, *i.e.*, from the point of view of the one who is realizing the experience; whereas the logic of a study is an analysis of the experience for which it stands, from the point of view of the one who has passed through the experience. (3) Does Froebel consistently make the child, as an active social being, with needs, impulses, purposes which receive their interpretation or fulfilment through social life, the *center for correlation*, or does he at times approach the *intellectualistic* position of Herbart, and make *not activities but ideas, not processes but products*, the educative centers? (4) Is Froebel's treatment of the relations of the natural, supernatural, and spiritual worlds consistent with his general monistic and immanental point of view? Has he adjusted in a consistent manner one to the other, the *so-called* life, knowledge, and beauty forms of the gifts?

The difficulties inherent in Froebel's treatment of the subject-matter of instruction may now be briefly summarized: (1) His failure to work out *a theory of knowledge* which would be *consistent with his general philosophical position*. (2) His frequent lapse from a *voluntaristic* psychology to a psychology of the *intellectualistic type of Herbart*. (3) His failure to keep always in mind the implications of his own doctrine of the social nature of consciousness. (4) His failure to distinguish in every case between the *logic of studies* and *their psychological aspect*, in other words, between studies as organized social experience and as modes of self-realization.

13. A further difficulty remains to be mentioned, the difficulty arising from what Dr. Harris speaks of as the *biological analogy*. It is by no means clear that Froebel's thought is free from the error due to the analogous application of the categories from one level of existence to the phenomena of a different order. This tendency, unfortunately, led him into all sorts of difficulties. "This tendency at the present time," says Professor

Baldwin, "is the bane of contemporary science other than physical. The theory of evolution is responsible for much of this cheap apology for science—biology used in sociology, physics in psychology, the concept of energy in history, etc. Evolution has been mistaken for reduction, the highest genetic modes being 'explained' in terms of the lowest, and much of the explaining done by 'explaining away' most that is characteristic of the highest. And biological or organic evolution itself is a storehouse of mistaken analogies brought over into the moral sciences."—(*Development and Evolution*, p. 334. See also the article of Dr. Harris, *The Danger of Using Biological Analogies in Reasoning on Educational Subjects*, Proceedings N. E. A., 1902.) The fact must not be overlooked in educational theory that the analogous application of principles from one order of being does not suffice to explain the phenomena of a higher order of being. The standard must be reversed before final interpretations may be made. The biological analogy may be used as preliminary to the analysis of such categories as organism, adaptation, development, environment, etc., because it is helpful, not because it is final. The fundamental category of self-consciousness, the working hypothesis of philosophic inquiry, can be understood, as Descartes long since pointed out, only through its own light. The key to its understanding is within itself.

The difficulty in the biological analogy as it affected the thought of Froebel is seen in his attempt to reconcile, (1) the conception of education as *a natural development*, the outcome of the silently operative laws of nature (in certain statements, it must be admitted, that Froebel approaches dangerously near the position of Rousseau, according to whose theory education must be *subordinated to nature* and at most consists in the removal of obstructions); and (2) the Fichtean conception of education which views it as essentially *a self-determining activity in the face of oppositions and in the light of ever worthier ideals;* in other words, the conception which demands *that activity be educative*. Though Froebel has furnished the general *schema*, and has perhaps done more than any other man to work out *in its principles* a *system* in which the two conceptions (from one point of view they are the conceptions, on the one hand of Leibnitz,

and of Hegel on the other) are adjusted, it is not clear that, their reconciliation is wholly satisfactory. The attainment of such a goal presupposes a long period of social coöperation as well as a body of organized knowledge obtained through an adherence to the *criteria* and *methods* of a strictly scientific and philosophic procedure.

14. It is always a difficult task to separate what is permanent from what is transitory in our inheritance from the past: it is one, however, which each generation has to undertake for itself. There is an especial reason why we should bring to the study of Froebel a truly critical and yet sympathetic attitude. His system presents a type of educational organization more in harmony with the spirit of democratic society than any other hitherto proposed. He himself declared, indeed, that the spirit of the American nationality was the only one in the world with which his method was in complete harmony and to which its legitimate institutions would present no barriers. On the other hand, it is asserted at the present time that the democratic institutions of America are on trial. Some there are who declare that the school has been unable to fulfil its part as the bulwark of democracy. The question, therefore, comes to us, What have the ideas of Froebel accomplished and what more can they accomplish in meeting the needs of American civilization? The spread of his ideas during the last twenty years is perhaps the most significant fact in the educational life of America during that period. Froebel saw in a unique way *the restorative function of the child and child-nature in the spiritual life of men and women*, and came to regard it as the deepest source of human welfare and improvement. With singular clearness he recognized that out of the education of the spiritual nature alone can issue that life and force and spirit which makes for democratic civilization in the highest sense.

As is well known, Froebel worked back in his thought from a survey of education in general to the education of a particular period. Had time and opportunity been vouchsafed to him, he would doubtless have framed a scheme of development in which he would have insisted on the same fundamental principles found in his formulation of the educative process in the kindergarten period. In this country at the present time the watch-

word is 'educational reconstruction' all along the line, in the elementary, secondary, and higher stages. It is, therefore, but natural to ask, *If Froebel's principles are operative (in the main) in one stage, are they not also valid in the other stages as well?* How far do the present methods and processes of the kindergarten relate themselves to the home life and experiences of the child, and to what extent do the same methods prepare the way to his subsequent development? Just here is the opportunity once more for those who will lay to heart and live by the spirit and truth, and not the mere letter, of Froebel's thought. The burden of criticism, of unceasing study, pursued in a spirit of openness to the light and fidelity to the truth, must not be shirked. If Froebel's thought is to assist in the educational reconstruction, if it is to shape the new education as it should, it must itself be criticised and freed from certain imperfect forms in which it has become embodied. *It must be modified or transformed in the light of truths brought forward by science and by the changed conditions of the Western world,*—truths which it cannot afford to neglect. *We live spiritually,* says Professor Royce, *by out-living our formulas and by thus enriching our sense of their deeper meaning.* The thought of Froebel, or the thought to which the thought of Froebel has given birth, must show itself capable of adaptation to the varied conditions, the novel social environment, the needs and aspirations of American life: it must be inclusive not exclusive: it must show itself capable of reconciling its adherents with themselves and of lifting their minds above the level of controversy; it must be self-assertive, and yet self-critical, disowning the unquestioning attitude of the partisan. Then and then only can it win the triumphs for which Froebel hoped and labored, and for which his true disciples hope and labor in turn.

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Practice, The Educational Situation, The Significance of the Problem of Knowledge, Principles of mental development as illustrated in early infancy, Logical conditions of a scientific treatment of morality, The Interpretation Side of Child Study, also *Elementary School Record;* Eby, *The Reconstruction of the Kindergarten,* in *The Pedagogical Seminary,* July, 1900; Francke, *History of German Literature;* Harris, *Psychologic Foundations of Education, Kindergarten Psychology, Social Culture in the Form of Education and Religion,* in *Educational Review,* January, 1905; also various articles in *Educational Review* and *Proceedings N. E. A.;* Hayward, *The Educational Ideas of Pestalozzi and Froebel;* Hughes, *Froebel's Educational Laws;* Mackenzie, *Outlines of Metaphysics;* Paulsen, *Evolution of the Educational Ideal,* in *Forum,* 1897; Roberts (Ed.), *Education in the Nineteenth Century;* Royce, *The Spirit of Modern Philosophy;* Russell, *German Higher Schools;* Snider, *Social Institutions;* Spalding, *Development of Educational Ideas in the Nineteenth Century,* in *Educational Review,* November, 1904; *Early History of the Kindergarten in St. Louis, Mo.,* in the *St. Louis Annual Report,* 1878–79; Vandewalker, *The Kindergarten and Higher Education,* in *Educational Review,* November, 1898; Welton, *A Synthesis of Herbart and Froebel,* in *Educational Review,* Vol. XX; Young, *Isolation in the School,* also, *Scientific Method in Education.*

Further problems for study:

1. Literary and philosophic influences in the life of Froebel.
2. Froebel's indebtedness to Pestalozzi.
3. Points of similarity between Froebel's and Leibnitz's view of knowledge.
4. The genesis of the ethical motive underlying the Kindergarten.
5. The conception of the individual in Rousseau and Froebel.
6. Froebel's solution of the equation between the individual and the social.
7. Play and work.
8. The child-study of Froebel.
9. The psychology of Occupations.
10. Bases of the Kindergarten program.
11. Froebel's conception of education in relation to the problem of democracy.
12. The adjustment of the Kindergarten to contemporary needs.

IX

RETROSPECT AND CONCLUSION

In concluding the present outline attention may be directed in a brief manner to certain truths which have tended to re-

appear constantly in the consideration of the period under review:

(*a*) Educational ideas are not artificially produced; they obey the laws of living organisms, are transmitted from generation to generation, and bear the impress of each succeeding age. The educational ideas of the period from Lessing and Herder to Hegel and Froebel were the outcome of the life and spirit of the German people during that era of transition, of aspiration, and of reconstruction. The work of the great educators of the period formed one of the most potential influences in a period of national humiliation in kindling in the German people an aspiration towards a worthier national life. Through their influence education became one of the vital movements of the time.

(*b*) The entire period, from one point of view it may be said, was one in which the true nature of the individual was made known. Rousseau, Kant, Lessing, Goethe, Pestalozzi, Schleiermacher, Fichte, Herbart, Hegel, and Froebel, all pleaded, each in his way, for the rights of the individual. The period was one of struggle for completeness of individuality. But the lesson was learned that the ideal of a perfect personality is to embrace the ideal of a perfect society, that *system of life* in and through human institutions in which are garnered the spiritual experience of the human race. Individual culture, in its true sense, can proceed only in the midst of a well-organized community.

(*c*) Closely connected with the new doctrine of personality which emerged in the movement from Rousseau to Froebel, is the achievement of the Idealistic movement from Kant to Hegel, which is in essential agreement with another great achievement in philosophy, namely, that of Greece. While representing different epochs and interpreting different types of human experience, the import of both is essentially the same. Each is an expression of that idealism which finds the interpretation of existence in mind as the ideal and real presupposition of the world. This idealism of Plato and Aristotle, of Kant and Hegel, discovers a spiritual principle in the orderly processes of nature, in the beauty of the world, in the consciousness of man, and in the unity and continuity of the spiritual life of humanity. But the idealism of the second period is more than a mere re-

affirmation of the truth arrived at in the first. It furnished a new and fuller demonstration, rendered possible by reason of the completer experience, an experience which humanity was forced to undergo in its advance to finer issues.

(*d*) The movement towards democracy which gave to the nineteenth century its most distinctive feature had its origin in the increasing sense of the worth of the individual, his spiritual and social significance, his rights and duties, an appreciation which in turn had its origin in the new movements in philosophy, in ethics, in religion, in science, and the new ideals of social amelioration and reconstruction.

(*e*) During the period a new appreciation of the meaning and significance of civilization, as embodied in art, science, philosophy, literature, and religion, as the means of development and liberation for the individual. Instead of being a hindrance, as Rousseau supposed, it came to be recognized that civilization represents the *methods so far organized of the true life of man.* For the individual, at birth, this civilization, *this system of norms and of methods*, is his spiritual inheritance. It becomes his spiritual possession in a large and fruitful way only through education. From the ethical and therefore from the educational point of view, civilization is the vicarious offering of the race to the individual, to be used, if he will but appropriate it, for the perfecting of his nature, for the rich and varied expression of the personal life.

(*f*) The study of the writers of this period makes it apparent that ultimately the end by which our desires are determined rests not merely on the process of psychological development, but in the very nature of reality. It may have its individual or psychological history or genesis: being from this point of view the last phase of the development of desire: but ultimately or metaphysically, the desire is intelligible only when it is recognized as *conditioned by or implied in the very nature of things.*

(*g*) The thought of the period was, moreover, intensely *human*, when for man was disclosed the soul in sense, the mystical beauty of nature, the divine effluence in the human soul, the spiritual sanctions of sympathy as well as of duty, the spirit of the little child long waiting for recognition, yet the interpreter

of the past as well as the hope of all the coming years. The literature of a later time may interpret man and human life more subtly and with greater exactness: not perhaps with greater earnestness or nobility. The period won *for human thought* the fact that the permanent *reality in experience* is personality—not any longer the *isolated individual* of Rousseau, but the *person* of Froebel and Hegel entering into the wealth of the world's life, or, in Shelley's words:

> "Man, one harmonious soul of many a soul,
> Whose nature is its own divine control,
> Where all things flow to all as rivers to the sea."

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SOME FISCAL ASPECTS OF PUBLIC EDUCATION IN AMERICAN CITIES

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I. INTRODUCTION

Twofold Aspect of Present Educational Thought.—There are at the present time two well-defined tendencies in our public educational thought and activity, which may be designated as the *scientific* and the *economic*. At the outset, it may be well to anticipate the possible obscureness or confusion arising from the use of these terms, possessing, as they do, meanings of both variable content and application.

The Scientific Aspect of Education.—The so-called scientific spirit is as old as modern science, and its invasion of the field of educational activity has been as extended and as rapid as those sciences, fundamental and cognate to education, have developed to act as guides and leaders for the advance.

This scientific aspect, as it concerns organized public education, is best defined by the many and varied efforts of the day to evaluate the results of educational endeavor; to measure in terms of some standard unit the relation between effort and result; to give to education, in a degree at least, some of the exactitude and precision which have grown up within the physical, biological, and social sciences. It has, as it were, assumed three phases. On the one hand is the child; on the other, the teeming and multiplex super-organism of society; between, stands the school as an adapting institution. Each of these primary elements of the educational process has been, and

is being, subjected to that searching inquiry, criticism and judgment characteristic of the scientific attitude, in order that there may be wrought into the structure of the organization, curricula, and aim of the school the established fundamental principles of human development and social efficiency. Every concrete study and investigation of the ever-changing and developing physical, mental, moral, and social capacities of the child; every attempt to define and estimate the working efficiency of the practices of the school, by means of more adequate standards; every measurement of the results of the school in terms of those values established in the social medium; every critical interpretation of the educational method and organization—the number and frequency of these during recent years furnish ample evidence of the ceaseless and ever-spreading scientific activity that seeks a rational purpose beneath educational practices and ideals, which, too frequently in the past, have been grounded in tradition, prejudice, or social inertia.[1]

The Economic Aspect of Education.—The application of the word "economic" to education may appear to be of doubtful validity or propriety. The materialistic elements and biased political associations of the word seem to have prevented its intrusion into the terminology of education; yet there are ample reasons to warrant the belief that there is soon to be developed a definite field of knowledge to which may be applied, with aptness as well as precision, the term "economics of education."

In a wide sense, the scientific aspect of education is inclusive of the economic aspect. Economics as a science, and in its broadest significance, comprehends the laws of the correlation and conservation of social energy. In this sense, all applications of scientific method to each of the threefold phases of public education have a final economic aspect; for every series of

[1] The argument here is not at all concerned with the doubtful discussion as to the existence of a "science" of education. Any attempt to establish a completer individuality for educational knowledge is likely to end in specious contention. However, the application of *scientific method* to the problems of education is another and different matter. Through this means will the problems be carried toward a rational, logical, and unbiased solution. Indeed, by it also, the problems themselves will become more clearly defined as the study of the appropriate phenomena progresses.

observations upon the workings of the developing mental, bodily or moral organization of the learning child, every alteration of administrative system and every revision of curricula have as a goal the influencing and improvement of the conditions under which the educational process may take place with the least of retardation, and with a minimum of waste of effort or energy. This is necessarily true if such observations are conducted above the plane of mere scientific dilettanteism, and if suggested administrative and instructional changes are posited as results of rational inquiry.

In its larger meaning, too, all education—especially all schemes for national public education, representing as they do the supreme conscious effort of peoples for the conservation and correlation of their social forces and for the perpetuation of their social traditions—has a definite economic significance. As the wealth, enlightenment, ideals and progressive character of peoples are determined in a large measure by their opportunities for education, so are their opportunities for education fixed by the material and ethical elements of their existence.[1]

Public Education as a Producer and Consumer of Social Energy. —As an instrumentality for the development of individual wholeness, for effecting the amalgamation and cohesion of diverse racial and cultural elements into a national unity, and for directing social energy towards social progress, we of the United States have doubted but little the total productiveness of our plan of education. Our faith has been instinctive rather than rational, for we have always lacked any definite standards by means of which its individual or social results could be tested with any degree of accuracy.

Qualitatively, through the roughly and ill constructed subjective standards of public opinion, it has been assumed that every investment of public funds in public education yielded an immeasurable dividend in the form of an enlightened, moral, and efficient citizenship.

Quantitatively, these dividends are almost impossible of measurement. Aside from the rather inadequate standards, established by statistical investigations of the illiteracy, crime,

[1] Seager, H. R., *Introduction to Economics*, pp. 233 *ff.*, gives a short, yet definite, exposition of the reciprocal relation of education and economic condition.

poverty, and earning capacity of our population, we have had no gauges with which to determine in any exact or satisfactory manner the amount of those elements of culture and worth, entering into individual and social values, which could be traced back to the influence of public education. This has been necessarily so, and there will perhaps always be a total absence of standard values in estimating the larger effectiveness of public education. For the forces generated and directed by organized education cannot be subjected to those modes of measurement applicable to physical forces which display a constancy and universality foreign to the activities of education, functioning as these latter do under the widely varying conditions of race and individual capacity, and of economic state and class ideals which arise in natural consequence of our democracy and freedom of competition.

On the other hand, the recognition of this phase of the economic aspect of the educational process, *as a problem*, is the first condition for the application of a scientific method for its solution. As our knowledge of the mental and physical capacities of individuals increases, and as our recognition of social necessities is expanded, we shall be enabled to accommodate and direct educational effort toward the largest, most economical and efficient ends.

Throughout whatever recognition and knowledge we have had in the past of the values derived from public education, and in most of the enthusiastic efforts to increase these values, the school has been viewed almost entirely as a *producer* [1] of social efficiency. While not entirely disregarded, the thought of public education as a *consumer* of social energy has not yet been developed in a manner likely to give a clear and accurate notion of its economic cost. The vast and increasing expenditures for the support of public education are, however, directing more and more the attention of publicists and those charged with the administration of the affairs of the public schools to the necessity of the possession of more reliable and accurate knowledge concerning the cost of this education we have established.

[1] I recognize the objections to the use of this term *producer*. Its real meaning will, I think, be readily comprehended. Its use enables me to carry out what seems to be a valuable analogy from economic science.

While the real cost of public education is, in some respects, as difficult of accurate measurement as are its results, there are certain objective phenomena by the measurement of which a more or less accurate statement of the consuming capacity of the public schools can be made. Even when limited to the amount of public money devoted to public education—and this by no means represents the total cost of such education[1]—our present-day notions of the cost of education are of a crude and inaccurate kind. It might be said in all truth that we do not know how much we are paying for public education, in spite of the overwhelming mass of apparently reliable information and statistics. The commonplace of "millions spent" and "millions spending" has benumbed our economic sense, and that clown of statistics—the average—has been made to perform grotesque antics to please and win the applause of both the unthinking and those inspired with ulterior motives.

Whenever doubt has arisen concerning the effective working of our educational plan, its shortcomings have been felt in an indefinite and vague manner. Not infrequently reforms are attempted through the transformation of the mode of legal and administrative control, or by means of remodelled curricula. In the main, however, one or the other of two standard remedies is generally proposed to-day to remove any recognized weaknesses of the plan and to provide for its rapidly expanding activities and functions: better prepared and more able teachers, and a more generous and adequate support. In our present social conditions the application of the first of these is recognized as being conditioned by the second. "More money" has become the banner word of those who, either through honesty of conviction or an unweening enthusiasm, hope to have realized within, and from, the public school those ideals and results consistent with its primary importance as a conservator of national efficiency.[2]

Public Education and Public Taxation.—However well-grounded in our American polity the idea of public taxation for

[1] See Giddings, F. H., *The Legal Aspect of Compulsory Education, Proceedings, National Educational Association*, 1905, for pertinent suggestions regarding the real social and economic cost of compulsory education.

[2] See Eliot, C. W., *More Money for the Public Schools*, for a virile and timely statement concerning this point.

the support of public education has become, perhaps *the* present most fundamental condition of the growth and efficiency of this distinctly American institution is the question of the rational limitation of the amount of public money to be devoted to it. This question is assuming a wider public interest each year. Aside from the increased demands for support due to mere numerical growth, the extension of the recognized function of the public school, and the numerous well-directed efforts to improve its effectiveness through the provision of more adequate facilities, have served to increase many-fold the financial burdens necessary to the institution and success of the reforms. To say that the burden has been borne ungrudgingly by the people would be a mere commonplace. To assume that twice the burden *could* be borne might be presumptuous.

The influence of persistent bodies of teachers,[1] who have come to the realization of the idea that justice and adequacy of teachers' salaries and of school support will come only through justice and equality in taxation, and of certain definite studies and investigations [2] of the financial conditions surrounding the public schools in various parts of the country, has stimulated both professional and public activity regarding the problem of the financial support of the public schools.

Summary.—The dominating aspects of educational thought and activity to-day may be characterized as the scientific and the economic. Broadly speaking, the first of these is inclusive of the second. The economic aspect is becoming, however, more and more specialized and separable from the scientific.

[1] The recent well-known campaign of the Chicago Teachers' Federation is an example of such activity, perhaps the most unique in American educational history.

[2] *Committee on Taxation as Related to Public Education.* Appointed at the meeting of the National Educational Association, Minneapolis, 1902. (*Proc. N. E. A.*, p. 312.) Final report submitted at meeting of National Educational Association, July, 1905 (86 pp.).

Committee on Salaries, Tenure, and Pensions of Public School Teachers in the United States. Appointed at the meeting of the National Educational Association, Boston, 1903. (*Proc. N. E. A.*, 1903, p. 308.) Preliminary report. (*Proc. N. E. A.*, 1904, pp. 370 *ff.*) Final report submitted at meeting of National Educational Association, July, 1905 (458 pp.).

Report of Committee on Taxation and Teachers' Salaries. Indiana State Teachers Association, 1904 (126 pp.).

In the life of a people an organized system of public education may be viewed as a *producer* of social efficiency and as a *consumer* of social energy. The most important problem before American education to-day is that of adequate support. There it needed, however, fuller and better knowledge of the actual consuming capacity of public education before the present support can be intelligently increased.

Aim of the Present Study.—The form of all education, and of all public education in particular, is cast in a mould of social ideals. In turn, it acts to shape new ideals of new generations. The influence and social value of these ideals cannot be readily subjected to a process of scientific measurement. On the other hand, it is possible to state in more or less exact terms some of those characteristics which mark contemporaneous public education as a consumer of social energy, valuing social energy in terms of the amount of public funds given over to the support of public education.

It is toward this economic aspect of education that the following study will be devoted, particularly as concerns the fiscal position of public education in American cities.

II. Public Education and the American City [1]

Public Education and the Scope of Modern Municipal Needs and Activities.—Undoubtedly, the most significant social phenomenon of the last half century has been the concentration of population in urban centres.[2] As a direct product of modern industrial development, the city has given rise to a multitude of new and unsolved social and political problems. Without undue exaggeration it may be said that the social and political problems of the nation are becoming localized in those of the cities. Among these problems, not the least in far-reaching and fundamental importance is that of public education. How

[1] The most satisfactory study we have upon this topic is Rollins, Frank, *School Administration in Municipal Government*, in *Columbia University Contributions to Philosophy, Psychology, and Education*, vol. xi.: see also Goodnow, F. J., *City Government in the United States*, Chap. XI., pp. 262–273.

[2] See Weber, A. F., *The Growth of Cities in the Nineteenth Century*, *Columbia University Studies in History, Economics, and Public Law*, vol. xi., for a comprehensive treatment of this subject.

to organize and administer a scheme of public education which will provide an adequate training and instruction, both in *kind* and *amount*, for the children of the cities, has become, and is yearly becoming more so, a paramount social issue.

Education, however, presents but one of the problems of modern municipal life. Not only are the children to be educated; property and life must be protected against crime, fire, and disease; an ample and uncontaminated water supply must be maintained; ease and safety of communication must be established; the needy, the unfortunate, and the dependent must be provided for; a social responsibility for the cultural welfare of all individuals must be recognized; above all, has come the demand for a form of administrative control at once responsive to the public mind and likewise efficient and conscious of a personal responsibility. Thus there have developed, co-ordinate with education, the almost equally important requisites of municipal life—efficient administrative systems, police and fire departments, courts of justice, jails and workhouses, health and inspection departments, street, sewer, lighting and water departments, hospitals, parks, and gardens—the list might be expanded many-fold, so extended have become the needs and the scope of modern municipal life and activity.

Increased Importance of Municipal Fiscal Problems.—For the satisfaction of its local needs the municipal corporation has been enabled to utilize, with few exceptions [1] and with numerous restrictions,[2] the right of local taxation conferred upon it by the state. The history of most American cities might be reflected in an account of their financial and taxing experience. Their life, prosperity, and intensive development have been bound up in the official wisdom and honesty employed in the use of their public funds.

The corollary of the expansion of municipal life has been the remarkable increase in municipal revenues, expenditures, and debts, the latter to-day exceeding in magnitude those of the Federal Government.[3] These revenues, in the main derived

[1] For example, the prohibition against local taxation for public education as has existed in several southern states.

[2] Minimum and maximum tax levies, limitations in the taxation of corporate and franchise values, etc.

[3] Aggregate of interest and non-interest bearing debt of the United

from direct taxation, have laid upon property as the chief subject of taxation a burden which causes even the enthusiast to hesitate in his demands for the continued expansion and intension of those social activities that are already, or that are thought fit to be, subject to public control and utilization.

Committed as we are in this democracy to a system of public education supported almost entirely from local taxation, the solution of the educational problem, in its final analysis, has become largely a matter of adequate financial support.

State Control of Municipal Education.—The American city has not developed independent of state legislation and government control.[1] In fact, under the influence of perverse political methods, on part of city and state alike, the American city has been brought under state domination. "Local autonomy" has become a figure of speech in many respects. However, it is over education that the authority of the state has been exercised with increasing force.[2] In the financial, as well as the political history and development of cities in America, education has held a somewhat peculiar position. In American polity, education has always been considered as a social activity, the ultimate control and administration of which was properly a state function. This has been and necessarily needs to continue to be a foundation principle of our educational scheme.

Partly as a heritage of our early semi-ecclesiastical control of education, and partly as a result of an early untutored political experience in the direction of educational affairs, local educational jurisdictions have grown up independent of the municipal jurisdictions, and frequently, when territorially coincident with

States Government Dec. 1, 1902 (*Monthly Summary of Commerce and Finance of the United States*, Treasury Department, December, 1902, p. 843)..... $1,311,574,059.

Total debt obligation of cities (160) in United States, above 25,000 population, at close of fiscal year 1902 (Bulletin No. 20, 1905, United States Bureau of the Census)..... $1,312,268,324.

Of the latter amount $1,172,798,788 was in the form of municipal bonds.

[1] Goodnow, F. J., *City Government in the United States*. Chap. IV., The Position of the City in the United States, pp. 69–88; Chap. V., State Control of Cities. Also his *Municipal Problems*, Chap. II, pp. 27–32, 63–89.

[2] Webster, R. H., *Recent Centralizing Tendencies in State Educational Administration*, gives a very satisfactory exposition of the present conditions.

the municipality, possess powers and authorities apart from the local civil administrative system. Thus the study of education, as a *municipal* activity, has been rendered extremely difficult. Especially complicated has become the fiscal aspect of education. In many states, boards of education in cities possess the power to levy and collect taxes, and to expend their funds wholly independent of the municipal authority.

The most important element in this complication has been the system of state subsidies of local education, which has grown up coincident with the extension of the control of the state over all education within its borders. The state subsidy, constructed as an instrument for the encouragement of the development of public education, and for the equalization of educational opportunity, serves in many respects to hide from our view the exact nature and extent of local adaptation and responsibility for support of public education.[1]

Through a combination of the influences arising from the special character of education itself, through the frequently demonstrated necessity of removing educational control from the rule of partisan politics, and through the exercise of the control of the state through its subsidies, there has been in the cities of most of our states a tendency toward the isolation, either artificial, or real and legal, of education in the field of municipal activity. In general this isolation in the past has been a necessity for the development of public education amid the ofttimes antagonistic political, social, or religious forces.

Fiscal Isolation of Municipal Education.—One of the chief supplementary results of this administrative isolation of public education in cities has been a sort of fiscal isolation. Statistics relative to the cost of education have been eagerly sought by those interested in this economic aspect of educational administration. Nowhere has any careful attempt been made to determine the true fiscal position of education in our cities, by which is meant the relation which educational revenues and expen-

[1] The complex systems for the support of public education in force in most of our states have rendered extremely difficult the obtaining of a correct notion regarding the relation between the state and local support. The statistics of the receipts of public schools of cities, compiled annually by the United States Commissioner of Education, wherein it is sought to differentiate state, county, and local receipts (Table VIII., pp. 1446–1458 of the Report for 1903) are exceedingly inaccurate and misleading.

ditures bear to those other revenues and expenditures deemed essential to the conditions of municipal life. The determination of these relationships appears to be a prerequisite to a more exact knowledge of educational finance itself, as well as to the extension of our present ideas relating to the social position and economic importance of the public school in the newer conditions of urban life.

Unity of Municipal Life.—There is growing to-day, though, a new conception of the place and function of education within the organic life of the municipality. The central notion of this later concept is that of the unification of the various forces which go to make up the municipal life, and of the elimination of those forces tending to disintegrate the essential elements of the wholeness of the community life. This thought of unity is, as yet, in the nature of an ideal. Prevailing political methods, traditional prejudices, and social inertness must be overcome and a keen sense of civic obligation developed before this unity can be realized. The doctrine which says that, "one of the chief dangers which menaces the security of our citizenship and the high purposes of the American state, in my judgment, is the mingling of municipal and educational functions,"[1] or that "while the state must accomplish its work for education largely through municipal agents, it must also prevent, so far as possible, any mixing of local politics with educational interests. *To this end the development of education must be made as independent as possible of other departments of municipal government,*"[2] must cease to be a working principle if our modern city life is to attain that efficiency demanded and desirable for real social progress.

Education, although primarily of state concern, is none the less a municipal responsibility, the complete realization of which will come only when it has been assigned its proper place within the scope of the whole municipal life.

[1] Draper, A. S., *Function of the State Touching Education*, in *Ed. Rev.*, xv. (1898), p. 109.

[2] Rollins, Frank. *Op. cit.*, p. 18. The italics are mine. In one sense the first statement of the quotation is true. It is difficult, however, to find justification from the arguments adduced for the general conclusions which Dr. Rollins reaches regarding the absolute supremacy of the state over municipal education.

III. Basis and Method of Investigation

At the commencement of this study, the two factors of most importance to be determined were the *basis* upon which, and the *method* by which, the investigation was to be conducted. The first would define the scope and variety of the data subjected to analysis, a matter of no small significance in this particular case. Through the latter, it was desired to get beyond the unsatisfactory and limited conclusions attached to current observations of the financial aspect of municipal school administration.

Financial Statistics of Cities.—As the initial aim was to obtain a view of public education in cities through the perspective of their total fiscal activity, the first requisite was to obtain the statistical data reflecting this activity. This was thought to be contained in the ordinary official municipal reports.

Without much difficulty there were obtained the annual financial reports of 120 of the 156 towns and cities in the states of New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine, possessing over 8000 population, according to the Census of 1900. This particular territory was selected because of its approximate homogeneous character, and because of the recognized custom of most of the towns and cities contained therein of issuing for distribution annual reports covering the scope of the various municipal activities. The promptness and courtesy of the various officials to whom the requests for information were sent are partial evidences of the high plane of official responsibility maintained in these cities. This was notably true in the case of the towns and cities of Massachusetts.

A preliminary survey of the total number of reports disclosed the superficial and unsatisfactory character, at least for the intended purpose, of the financial data contained in most of them. They varied in excellence from the complete detailed statements of the work and financial operations of each city department, as for example those of Cambridge, Springfield, Newton, Boston, Manchester, and Rochester, to a bare enumeration of the municipal expenditures, listing the warrants in the order in which they were paid by the city treasurer, together with the amount and name of the payee. The only common term of the

reports seemed to be the effort to display official honesty in the handling of public moneys.

Some two hundred hours were spent in a thorough examination of twenty of the best and most complete of the reports. However, the variation in the completeness, and in the systems of classification, accounting, and reporting of municipal receipts and expenditures, presented very many obstacles to a satisfactory comparative study on the basis of the financial data contained in even these reports.

Recourse was now had to the financial information concerning cities published in the bulletins of the United States Department of Labor.[1] This statistical data had been gathered in compliance with an act passed during the second session of the Fifty-fifth Congress, by which, "the Commissioner of Labor is authorized to compile and publish annually, as a part of the Bulletin of the Department of Labor, an abstract of the main features of the official statistics of the cities of the United States having over 30,000 population."[2] In the introduction to the first report issued under the provisions of this act, September, 1899, the then Commissioner of Labor, Carroll D. Wright, has given an insight into the difficulties attendant upon the gathering of the statistics published:

> The act of Congress . . . apparently contemplated a compilation of the official statistics of the various cities of 30,000 population and over from data to be furnished to the Commissioner of Labor by the cities themselves, such as, for instance, were included in their official annual reports, etc. Steps were taken, therefore, to obtain such reports from the officials of the various cities, and many reports were promptly received. In a number of instances, however, no reports were received, even though repeated efforts were made to secure them. In some cases the Department was informed that no printed reports were available, while in other cases no reply whatever was received in answer to its requests. An examination of the reports received showed that very few facts were reported uniformly by all of the cities, and that even the important financial statements were presented in so many different forms as to preclude such classification of the various items as seemed necessary for a satisfactory comparison.

[1] No. 24, September, 1899; No. 30, September, 1900; No. 36, September, 1901; No. 42, September, 1902.

[2] Bulletin No. 24, United States Department of Labor, September, 1899, p. 625.

It was believed that in order to be valuable for comparison and for other purposes the various items relating to the governmental, financial, and other conditions of these cities should be reported uniformly and accurately. Even had the Department been furnished with the reports for all of the cities within the limits of the investigation, the many difficulties encountered in a tentative effort with the reports already received led to the conclusion that uniformity and accuracy could be secured only by sending the special agents of the Department to the cities for the data desired. A schedule of inquiries was accordingly prepared and the work taken up by the agents of the Department at once. The utmost interest in the investigation was manifested in nearly every city by the officials who were visited, and they gave freely their time in compiling the data desired and in every way assisted the Department in the work. In many cases the methods of bookkeeping in vogue made a uniform classification of financial items, as called for by the schedules of the Department, very difficult and required much time and labor.

Under the provisions of the above mentioned act, four annual bulletins of the statistics of cities were issued by the Department of Labor, the last one being distributed in September, 1902, and containing the data for the year 1901. Upon the creation of the Department of Commerce and Labor as a cabinet department in 1903, the work of gathering and publishing these municipal statistics was transferred to the permanent Bureau of the Census.

The data presented in Bulletins 36 and 42 of the Department of Labor, issued in September of 1901 and 1902, respectively, have been made the basis of the first portion of this study.[1] The last two of the series of four bulletins were selected because of their evident superiority in completeness and accuracy over the first two.

The reasons for selecting these data are as follows. First, aside from the incomplete and otherwise unsatisfactory statistics of a similar nature presented in the publications of the Tenth and Eleventh Censuses, they comprised the only source of either moderately complete or fairly reliable material such as it was

[1] This study was begun and completed before the data of the financial operations of cities for 1902 and 1903, published in *Bulletin 20*, Bureau of the Census (September, 1905), became available. The recent and more complete data gathered by the Bureau of the Census has been made the basis of the second portion of the study. See Sections X. and XI.

necessary to employ in the present instance. The almost overwhelming obstacles and prohibitive expense preclude the gathering of data of this variety and scope through individual effort. Second, because they pertained to *all* of the cities of the indicated population class, an element altogether too frequently disregarded, especially in comparative educational statistics.

There is also a secondary reason for subjecting such data as these to a critical examination; for by such examination their value or uselessness for scientific purposes may be demonstrated. Municipal statistics, even when gathered through the agency of the Federal Government and with undoubted motive of making a valuable contribution to municipal and economic sciences, should be subjected to some process of interpretation beyond that of mere gross and doubtful comparisons, if the final and more valuable purpose is to be attained.[1]

Method of Statistical Treatment.—Apart from the details of treatment recorded in the following pages, it is desired to emphasize here the two fundamental principles underlying the method pursued.

The first is the principle of *inclusion.* That is, with the data for 1900 and 1901, all cities possessing 30,000 or more population have been included.[2] The immediate aim has been to present some of the fiscal aspects and relationships of education in the American city, regarded as a *type.*

The second is the principle of *relativity.* In more than one way has public education become isolated as a social institution; and this has been the more so with such of the features as are usually presented by financial statistics. The statistics of public school enrolment or attendance of any particular city, for

[1] "No attempt has been made to interpret and compare the statistics here presented. In this respect the Bureau again follows the precedent of the Department of Labor. But it is believed that after the inquiry has been carried on for a longer period and the methods of collecting the statistics further perfected, the time will be ripe for a study of the data, which may lead to reliable and interesting comparisons and deductions." —(*Bulletin 20*, Bureau of the Census, 1905, p. 4.)

[2] This is not *wholly* true, inasmuch as three of the 135 cities were necessarily excluded from consideration, owing to partial or total absence of essential data. An adequate note of these exceptions appears in the proper place, see pp. 20 and 24 (Foot note (*b*)). No attempt has been made to select cities for study on the grounds of any presupposed or real, positive or negative, excellence, either educational or otherwise.

instance, are not valuable in themselves as social statistics, unless there is known also the number of adults in the community and the number of pupils who do not attend school or who attend schools other than public schools. A statement of the salary standards of public school teachers in the different cities of the country has no particular meaning, unless accompanied by some notion of the standards maintained in other professional work and of the standards of living in the various communities. Thus, too, with the data of educational expenditures as a whole. Our entire list of concepts regarding these factors has been formulated by viewing educational activity almost entirely apart from the other essential activities of modern municipal life. In view of the present development and increasing demands of public education in American cities, there is need for some scientific study of its cost in relation to that of other municipal functions. The use of the Pearson Coefficient of Correlation for stating these relationships as they have been found to exist may, by some, be thought to savor somewhat of over-refinement. In reply to this anticipated objection it may be said that it is owing to the lack of the application of the more refined statistical methods to the data of educational organization and practices that has rendered both useless and misleading much of the so-called statistical material. The use of such a factor as the Pearson Coefficient has been found to be of indispensable service in the realm of the biological and social sciences. Its definite application to the fiscal problem of education [1] may mark a step in advance and provide us with an efficient instrument for testing the validity or falsity of our present notions and standards.

IV. Character, Arrangement, and Preliminary Manipulation of Data

Data of Expenditures for Municipal Maintenance and Operation for 1900 and 1901.—Tables XX. and XXII. of Bulletins 36 and 42, respectively, of the United States Department of Labor contain the expenditures for maintenance and operation of the

[1] The adequacy of the Pearson Coefficient in this respect has been admirably demonstrated by Dr. George D. Strayer in his recent study, "City School Expenditures," *Teachers College Record*, Vol. VI., pp. 107–209.

governmental activities of the 135[1] American cities possessing a population of 30,000 or over according to the Census of 1900. These expenditures are classified under the following headings: (1) police department; (2) police courts, jails, workhouses, reformatories, etc.; (3) fire department; (4) health department; (5) hospitals, asylums, almshouses, and other charities; (6) schools; (7) libraries, art galleries, museums, etc.; (8) parks and gardens; (9) sewers; (10) municipal lighting; (11) street cleaning; (12) street sprinkling[2]; (13) other street expenditures; (14) garbage removal; (15) interest on debt; (16) waterworks; (17) gas-works; (18) electric-light plants; (19) docks and wharves; (20) ferries and bridges; (21) markets; (22) cemeteries, (23) bath houses and bathing pools and beaches; (24) other items. Accompanying the tables are numerous notes in reference to peculiar characteristics or arrangements of the data for particular cities.

Naturally, in view of the difference in size, location, and standards of municipal life of the various cities, the expenditure for each of the above items is not to be found for every city. It was not possible, for example, in many cities to separate the expenditures for the police department from those for police courts, jails, etc.; in some, jails and police courts are maintained at county or state expense. Many include expense for garbage removal under health department, or possibly under streets; many keep no separate accounts for street cleaning, street sprinkling, sewers, etc., all of these items being included in a general item of street expenditures. However, a close examination of the tables revealed a sufficient degree of completeness in the items with which it was desired to work.

For statistical purposes, and even for a clear insight into the financial operations of cities, the system of classification employed in the arrangement of these data is open to serious objection. This whole subject of accounting and classification of public revenues and expenditures, at least as far as such investigations as this are concerned, is taken up at length and in greater detail in a later section.[3]

[1] Bulletin 42 contains 137 cities. The 135 cities common to both bulletins were selected in order to give data for two years for all cities considered.

[2] In Bulletin 36 items 11 and 12 are included as one item.

[3] Section VII, p. 46 ff.

Showing percentages of total amount expended for maintenance and operation

All cities in the United States

	City.	Police department.	Police courts, jails, etc.	Fire department.	Health department.	Hospitals, asylums, almshouses, etc.	Schools.	Libraries, art galleries, museums, etc.	Parks and gardens.	Sewers.	Municipal lighting.
1	New York, N. Y.	10.15	.791	4.66	.924	4.66	14.9	.555	1.72	.648	2.45
2	Chicago, Ill.	19.30	1.460	8.30	.878	.04	31.8	.894	3.30	2.00	2.19
3	Philadelphia, Pa.	14.30	2.640	5.02	1.480	2.49	17.1	1.33	2.63	.432	5.75
4	St. Louis, Mo.	17.80	1.270	8.01	1.420	6.14	16.8	.453	1.29	1.12	5.72
5	Boston, Mass.	8.66	6.660	6.26	.824	6.16	15.4	1.61	2.50	1.88	3.77
6	Baltimore, Md.	11.20	2.770	5.84	.995	4.07	15.4	.034	3.29	.418	5.22
7	Cleveland, Ohio	8.64	1.910	9.83	1.540	2.73	23.7	1.65	.786	.694	5.15
8	Buffalo, N. Y.	13.10	.406	11.00	.725	2.60	19.1	1.65	3.21	.197	5.79
9	San Francisco, Cal.	14.80	1.980	9.88	1.660	3.82	20.9	.754	2.66	.824	3.94
10	Cincinnati, Ohio	9.88	1.840	8.13	.677	3.45	17.3	1.13	.611	.696	5.56
11	Pittsburg, Pa.	8.07		7.85	1.310	2.25	13.5	1.03	2.88	1.11	4.75
12	New Orleans, La.	5.60	1.330	6.24	1.190	1.18	10.4	.173	.205		5.14
13	Detroit, Mich.	16.00	.341	14.60	1.030	2.09	23.9	1.79	2.89	1.41	
14	Milwaukee, Wis.	9.32	.507	11.40	.979	.36	21.1	1.60	1.86	1.40	6.25
15	Washington, D. C.	13.00	6.790	4.60	1.350	7.50	21.7	.140	1.16	1.39	4.62
16	Newark, N. J.	8.55		5.88	1.190	4.25	18.3	.713	.0937	1.27	4.37
17	Jersey City, N. J.	9.94	.234	5.28	.176	.73	11.0	.763	.142	.348	3.99
18	Louisville, Ky.	9.77	3.770	8.96	.301	2.23	17.9		1.70	.497	4.87
19	Minneapolis, Minn.	7.36	.537	11.20	.842	3.03	25.6	1.43	2.51	1.26	5.12
20	Providence, R. I.	9.56	.120	9.41	.451	1.06	17.9	.331	1.19	1.74	8.04
21	Indianapolis, Ind.	9.02	.160	10.10	.722	2.42	33.2	2.82	4.48	4.77	6.73
22	Kansas City, Mo.	11.90	1.160	11.90	1.960	.16	26.5	.963	2.39	.424	4.06
23	St. Paul, Minn.	7.70	1.640	8.25	.377	1.00	19.0	.615	2.40	.714	8.06
24	Rochester, N. Y.	5.54	.435	6.68	1.240	3.15	16.1	.077	.787	.0997	7.87
25	Denver, Col.	7.56	.724	8.35	1.520	1.87	37.2	1.27	3.05	.831	7.88
26	Toledo, Ohio	6.96	1.870	7.57	1.040	(a)	25.9	.732	1.17	.872	5.14
27	Allegheny, Pa.	6.85		6.67	.763	3.55	17.3	1.15	1.37	.754	
28	Columbus, Ohio	7.05	1.010	9.56	1.290	.66	22.5	.522	.535	.658	3.53
29	Worcester, Mass.	5.65		6.36	1.110	5.56	21.2	1.58	1.04	11.5	4.61
30	Syracuse, N. Y.	7.57	.735	9.22	.817	5.86	21.8	1.93	1.91		5.90
31	New Haven, Conn.	13.50	.967	9.78	.538	5.25	26.6	1.13	1.41	.798	5.46
32	Paterson, N. J.	9.99	.299	10.10	.584	5.22	25.2	1.56	2.44	.954	6.41
33	Fall River, Mass.	8.54		7.57	.933	8.22	18.1	1.01	.186		6.01
34	St. Joseph, Mo.	12.60	1.250	12.90	1.680	.41	28.4	1.22	1.14	.825	
35	Omaha, Neb.	5.42	.739	8.11	.539	.30	25.6	1.29	1.29	1.93	5.32
36	Los Angeles, Cal.	9.57	.719	9.14	.914	.29	32.7	1.39	4.08	.306	3.27
37	Memphis, Tenn.	11.20		9.41	7.460	3.55	15.9	.698	.229		5.17
38	Scranton, Pa.	8.05	.519	7.39	.709		48.6	1.42	.641	1.03	6.37
39	Lowell, Mass.	10.20		8.69	2.34	9.27	24.7	1.05	.959	1.16	6.56
40	Albany, N. Y.	11.40	.461	9.92	.929	4.81	22.5	.416	2.56	.124	5.12
41	Cambridge, Mass.	5.71		4.17	.922	4.89	21.4	.700	.928	4.30	3.25
42	Portland, Ore.	4.94	.305	7.40	.320	.37	22.9		.807	.366	4.32
43	Atlanta, Ga	13.70		10.60	10.60	4.83	14.5	.481	1.38	.586	7.09
44	Grand Rapids, Mich.	7.94	.968	11.40	1.260	2.12	28.1	.694	2.16	.739	
45	Dayton, Ohio	7.84	1.630	8.65	.584	1.39	32.7	1.02	.245	.258	5.19
46	Richmond, Va.	8.38	.337	7.45	.743	3.24	10.6	.411	3.02	.152	2.58
47	Nashville, Tenn.	10.60	.501	10.20	2.220	2.55	20.7	.310		.124	5.63
48	Seattle, Wash.	5.84	.733	7.94	.934	.38	18.9	1.06	.501	.305	1.94
49	Hartford, Conn.	9.24	.652	9.06	.915	6.64	24.2	.827	1.83	.591	4.31
50	Reading, Pa.	9.38		6.51	.505		28.2	.528	1.77	4.67	9.08
51	Wilmington, Del.	12.40	.614	5.71	1.200	.13	25.9	1.04	2.02	.526	7.06
52	Camden, N. J.	13.40	.611	10.20	.476	1.35	24.7	.132	.159	.136	9.58
53	Trenton, N. J.	11.20	.470	9.81	.716	2.29	21.1	.573	1.57	.942	2.65
54	Bridgeport, Conn.	8.27	1.070	9.98	.921	8.07	23.4	1.73	2.68	.863	7.51
55	Lynn, Mass.	6.14		7.18	.857	7.79	18.4	1.77	.511	.888	3.94
56	Oakland, Cal.	12.80	1.200	11.40	1.430	.30	37.6	1.82	1.33	.673	8.62
57	Lawrence, Mass.	7.33		6.68	4.950	7.83	21.2	1.48	.716	.953	4.07
58	New Bedford, Mass.	11.00		7.22	.769	5.66	20.2	1.42	1.89	.788	4.93
59	Des Moines, Iowa	5.96	.791	9.71	1.900	.34	40.7	1.14	2.10	1.99	6.85
60	Springfield, Mass.	5.12		7.96	.498	4.39	26.7	2.40	1.98	.409	4.89
61	Somerville, Mass.	5.33		7.39	.933	3.13	25.0	1.22	.934	.839	4.76
62	Troy, N. Y.	11.60	.469	6.60	1.340	10.60	18.7		.269	.466	7.67
63	Hoboken, N. J.	14.10	.444	9.96	.705	2.36	24.0	1.05	.588	.743	3.30
64	Evansville, Ind.	9.15	.427	10.20	.499	.17	31.9		.196	.404	5.77
65	Manchester, N. H.	6.53	.452	13.00	1.290	3.33	18.7	.839	.866	.59	8.96
66	Utica, N. Y.	6.28	.363	10.70	1.200	2.57	24.3	1.04	.437	.706	9.53
67	Peoria, Ill.	9.56	2.440	9.81	1.140		31.4	1.82	1.95	.942	7.21
68	Charleston, S. C.	12.70		8.30	2.000	11.50	12.3	.081	1.05	1.53	4.90

(a) Less than .01.

[1] Percentages obtained from data published in Bulletin 36 of

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devoted to each of the municipal departments for the fiscal year 1900 [1]

above 30,000 population

Street cleaning and sprinkling.	Other street expenditures.	Garbage removal.	Interest on debt.	Waterworks.	Gas-works.	Electric-light plants.	Docks and wharves.	Ferries and bridges.	Markets.	Cemeteries.	Baths.	Other items.	
4.10	1.84	1.04	13.12	3.22			.656	.360	.067		.048	33.69	1
3.02	1.50	2.25	6.73	6.36		1.54	.101	1.030	.017		.054	7.27	2
1.63	3.59	2.96	10.90	7.79			.024	5.210	.023		.495	19.40	3
3.32	3.57	2.15	8.66	6.70			.660	.379	.073			14.50	4
2.67	7.32	3.16	11.10	6.47				2.040	.142	.332	.572	12.40	5
2.67	2.19	2.22	20.10	3.62			.056	.286	.069		.054	19.50	6
1.20	1.99	1.50	14.40	5.89				2.250	.450	.648		15.10	7
2.98	4.02	1.86	10.90	5.86			.756	.179	.230	.001	.01	15.40	8
2.70	3.13		.25					.096				32.50	9
3.29	1.68	.42	28.90	7.85			.080	.445	.221			7.83	10
2.47	4.25	1.40	12.40	4.65			.382	.757	.288			30.80	11
2.94	.26	2.49	14.70									48.20	12
4.69	11.50	1.79	8.64	3.60		3.34		.589	.070			1.71	13
5.16	3.80	4.80	9.22	4.46			.078	1.720			.325	15.80	14
3.48	6.42	1.14	8.43	3.32				.651	.134		.020	14.10	15
2.54		1.38	8.37	6.96					.415		.121	35.70	16
1.47	2.99		23.20	8.96			.073					30.70	17
3.60	5.59		17.60	4.91			.279					17.90	18
5.90	2.03		12.90	3.74				.365				16.30	19
1.73	5.57	.698	20.50	2.64				.636		.626		17.90	20
5.36	1.54	2.53	7.72	.18				.301	.632			11.80	21
4.41	1.15	.94	12.00	8.48				.238	.088			11.50	22
4.34	3.36	.88	22.50	3.47				2.730				12.80	23
3.10	1.89	2.69	21.80	2.58				.595		1.120		24.20	24
4.18	.952	.52	7.60					.017	.382			17.40	25
2.53	4.79	.81	21.10	4.81	1.24			1.380	.513	.626		11.30	26
2.73	5.53	1.59	14.00	12.50		4.21	.170		.321			20.70	27
3.96	.82	.81	21.10	6.91		.020			.451			18.50	28
2.90	8.72	.70	14.90	2.56							.020	11.50	29
5.01	3.66	4.05	15.20	5.52				1.610	.275	.077	.283	8.63	30
6.45	3.89	.39	10.50					.772				12.40	31
4.60	5.09	2.78	12.30									12.50	32
2.54	7.17	2.01	8.29	9.66						1.380		18.30	33
2.46	4.81		15.80			5.58		.206				10.70	34
1.62	2.52		20.20						.148			24.90	35
6.49	5.91	.82	4.89									19.40	36
3.06	10.33		18.60				.756	2.350	.668			10.60	37
1.85	2.06	.43	8.06					.694				12.30	38
2.35	2.21	1.41	13.70	6.38						.709		8.09	39
2.49	2.27	.03	16.60	9.23				.377	.118			10.70	40
2.79	7.06	2.49	14.70	3.37				2.360		.826	.061	19.90	41
3.18	1.00	.36	27.00	3.66								23.00	42
	4.20		14.50	5.87				.145		.837		11.00	43
3.69	.68	.44	7.50	8.93		2.22		.154	.373	1.950		18.70	44
2.31	2.61	2.05	19.80	4.46				1.580	.669			7.02	45
2.81	3.36	1.62	30.90	3.14	11.90			.292	.497	.717		7.60	46
1.62	6.81	3.74	20.60	6.82					.343			7.17	47
.854	2.05	.06	20.30	7.14			.181	.035				30.60	48
4.72	13.6	1.87	13.10	4.59				.835		.422	.181	2.61	49
2.26	3.84	2.83	8.37	8.32					.157			13.50	50
2.35	3.34	4.18	13.50	9.27							.038	10.70	51
1.57	3.77	1.09	16.70	9.49								6.54	52
2.43	2.11	1.46	20.10	7.46								15.10	53
3.48	6.19	3.28	9.12					.575				13.00	54
1.55	6.21	2.61	15.40	4.68						2.190		19.60	55
6.94	2.64		3.39				.429					9.44	56
2.38	5.48	1.37	13.00	7.22				.371		1.300		13.60	57
1.10	5.51	2.24	16.90	4.45			.624	.168		2.89	.071	11.90	58
2.24	1.46		4.59					1.950		1.24	.151	16.90	59
3.43	3.32	1.80	11.10	3.94								22.20	60
1.62	6.09	1.89	6.29	5.73				.039				31.23	61
9.86	.63	4.55	7.92	8.65			.013	.041	.040	.096		10.40	62
1.61	.25	.48	8.49	21.10						.475	.203	10.00	63
1.64	1.32	.62	18.60	7.14			.111	.077	.311			11.30	64
2.15	12.20	2.68	13.10	3.88						1.980		9.50	65
4.00	1.72	1.73	3.15					.328			.065	29.10	66
2.62	3.53	.12	8.89				.021	1.440				17.20	67
	5.15	3.84	25.4						.056			10.80	68

[1] the Department of Labor, September, 1901.

Showing percentages of total amount expended for maintenance and operation

All cities in the United States

	City.	Police department.	Police courts, jails, etc.	Fire department.	Health department.	Hospitals, asylums, almshouses, etc.	Schools.	Libraries, art galleries, museums, etc.	Parks and gardens.	Sewers.	Municipal lighting.
69	Savannah, Ga. (*b*)										
70	Salt Lake City, Utah	4.81	.609	5.18	.722	.86	30.5	.864	.904	.165	3.77
71	San Antonio, Tex.	8.82		7.45	1.220	2.11	22.1		2.18	.005	1.15
72	Duluth, Minn.	3.38	1.470	9.43	.596	1.16	21.2	.677	1.51	.67	2.40
73	Erie, Pa.	7.09	.661	11.80	1.290	.01	32.2	2.00	.824		8.28
74	Elizabeth, N. J.	8.63	.131	3.97	.655	3.16	20.7			.648	4.31
75	Wilkesbarre, Pa.	9.49	1.230	10.30	.871		39.7		1.41	2.21	10.50
76	Kansas City, Kas.	7.93	.741	6.71	5.820		27.7	.347	4.48	1.93	6.25
77	Harrisburg, Pa.	7.37		5.35	.809	.06	33.8		.232	.116	7.87
78	Portland, Me.	5.51		6.81	.269	4.81	17.2	.623	.881	1.01	3.99
79	Yonkers, N. Y.	9.41	1.040	3.04	1.890	.52	23.5	.441	2.22	.502	7.11
80	Norfolk, Va.	7.42	.124	6.07	2.590	1.98	6.8	.197	1.34	1.91	2.76
81	Waterbury, Conn.	8.79	1.130	7.66	.714		39.5	.236	.236	1.18	5.18
82	Holyoke, Mass.	6.34	.512	9.17	.599	6.24	27.2	.428	.963	.351	4.02
83	Fort Wayne, Ind.	8.24		13.90	.909		28.7	1.40	2.81	.661	7.32
84	Youngstown, Ohio	11.40	.996	8.85	1.840	2.32	35.7	.392	1.19	.584	6.65
85	Houston, Tex.	8.91		10.00	3.390		17.9		.443	.414	2.05
86	Covington, Ky.	7.54	.149	7.67	1.890	4.07	19.8			.776	3.10
87	Akron, Ohio	7.49	.831	13.20	.789	4.04	30.4	.678	.835	.349	7.99
88	Dallas, Tex.	7.99	1.100	7.67		3.63	17.6		.602	.035	4.95
89	Saginaw, Mich.	6.84	.757	6.77	.072	3.86	35.1	.236	.136	.296	5.91
90	Lancaster, Pa.	7.42		6.85	.682		33.0			.361	11.20
91	Lincoln, Neb.	3.74	.614	7.75	.977	.03	34.9	1.03	.023	1.14	4.82
92	Brockton, Mass.	5.96		8.22	1.010	6.85	20.3	1.69		1.42	4.03
93	Binghamton, N. Y.	7.83	.480	6.32	1.820	2.40	37.1	.368	.933		11.20
94	Augusta, Ga.	12.40	.899	12.30	1.680	6.14	17.6			1.01	5.45
95	Pawtucket, R. I.	6.79	.006	5.40		2.62	17.7	.993	.111	1.46	4.51
96	Altoona, Pa.	6.68	.336	7.79	.790		34.1			.207	6.31
97	Wheeling, W. Va.	6.88	1.200	8.56	1.240		25.1	1.19		.626	
98	Mobile, Ala. (*b*)										
99	Birmingham, Ala.	12.20	3.870	9.45	2.370	1.20	13.7		.440	.058	5.09
100	Little Rock, Ark.	13.10		13.90	2.610	3.06	34.1			.784	
101	Springfield, Ohio	6.25	1.230	6.38	.495	5.71	28.5	1.15	2.56	.952	8.65
102	Galveston, Tex. (*b*)										
103	Tacoma, Wash.	2.79	.245	4.34	.260		10.9	.356	.629	.797	
104	Haverhill, Mass.	5.41		8.52	.580	6.55	21.3	2.31	1.24	1.13	6.00
105	Spokane, Wash.	6.55	.716	11.50	1.310	1.32	20.9	.380	.484	.219	1.72
106	Terra Haute, Ind.	8.33	1.250	10.80	.975	2.13	35.8	1.75	.545	.402	6.39
107	Dubuque, Iowa	7.94		8.65	.448		28.8		.362	1.33	6.79
108	Quincy, Ill.	7.87	3.290	10.40	1.380		26.9	1.75	1.47	.461	7.36
109	South Bend, Ind.	7.67		10.60	.308		32.3	1.08	1.75	.866	6.48
110	Salem, Mass.	6.22		5.43	2.950	7.57	20.0	1.19	.979	.696	6.50
111	Johnstown, Pa.	8.54	.288	4.90	.481		45.6			.979	8.43
112	Elmira, N. Y.	8.86		14.90	1.620	3.14	22.6	.328	1.25	.778	9.49
113	Allentown, Pa.	4.49		9.37	.747		36.9				8.08
114	Davenport, Iowa	7.48		7.36	2.030		39.6		1.78	.361	6.76
115	McKeesport, Pa.	8.59		10.10	1.380		30.8			.355	5.72
116	Springfield, Ill.	9.28	929	12.20	.555		29.5	.868	.929	.577	6.56
117	Chelsea, Mass.	7.33		7.03	2.210	10.60	25.5	1.02	.275	.472	5.92
118	Chester, Pa.	9.55		5.19	.905		34.6		1.77	3.89	8.86
119	York, Pa.	9.84		7.61	.412	.17	36.3		.187		11.90
120	Malden, Mass.	5.23		5.39	2.580	6.35	21.9	1.53	1.23	1.42	4.63
121	Topeka, Kansas	6.62	.615	8.27	2.570		35.8	1.30	1.89	.345	.04
122	Newton, Mass.	5.71		5.38	1.810	3.01	16.1	1.37	.438	4.57	4.45
123	Sioux City, Iowa	5.21	.451	6.38	1.030		27.2	.571	.33	1.53	4.36
124	Bayonne, N. J.	7.56	.078	2.00	.626	.52	22.8	.822		.037	6.84
125	Knoxville, Tenn.	9.15		9.77	.615	2.21	18.2				9.52
126	Schenectady, N. Y.	10.40	.735	6.36	1.820	2.37	24.5	.612	.169	1.48	7.12
127	Fitchburg, Mass.	6.57		5.56	1.070	6.99	21.7	1.78	.584	1.18	6.05
128	Superior, Wis.	4.37	.509	7.25	1.390	.66	23.1	.572		.594	1.94
129	Rockford, Ill.	5.37	.572	8.64	.645	.40	34.9	1.84	.249	.476	7.68
130	Taunton, Mass.	8.14	.187	5.48	.737	6.51	23.5	1.54	.249	.725	1.83
131	Canton, Ohio.	6.46		8.28	.874	1.18	31.7	.345	.691	1.89	6.98
132	Butte, Mont.	11.60	1.560	12.40	3.090		38.6	2.37		.275	4.37
133	Montgomery, Ala.	9.98		7.21	2.460	.55	7.41				4.90
134	Auburn, N. Y.	5.03		5.99	.858	4.60	23.9	.581		.351	8.14
135	Chattanooga, Tenn.	10.60		11.20	4.390	2.15	15.0	.05	1.52	.536	10.3

(*b*) No data for school expenditures. [1] Percentages obtained from data published in Bulletin 36 of

No. 1 (*Continued*)

devoted to each of the municipal departments for the fiscal year 1900 [1]

above 30,000 population

Street cleaning and sprinkling.	Other street expenditures.	Garbage removal.	Interest on debt.	Waterworks.	Gas-works.	Electric-light plants.	Docks and wharves.	Ferries and bridges.	Markets.	Cemeteries.	Baths.	Other items.	
													69
5.78	1.48	1.19	21.60	6.25						1.12		14.10	70
4.05	8.38	2.37	21.10						.352			18.80	71
.78	2.48		27.90	2.93	2.56		.99		.015			19.50	72
1.14	3.34		8.69	11.60			.215	2.280				10.60	73
	4.02	1.12	22.70									30.00	74
	6.99		7.03							.532		11.20	75
2.46	2.31		24.10					1.490		.029		11.90	76
1.23	5.08		14.90	7.51				3.560				12.20	77
1.68	6.21	.47	14.20							2.57		33.90	78
3.45	3.26	3.21	19.20	5.74				.058			.329	15.10	79
4.20	2.43		30.30	6.05					.098	.922		24.90	80
2.01	2.24	1.65	12.60	4.56								12.20	81
2.43	2.13	2.69	14.80	4.94				.831			.058	16.20	82
2.51	2.87	1.88	10.00	8.15				.328				10.20	83
5.58	.33		9.87	5.29				.097				10.00	84
.58	11.50	2.89	25.70					.065	.997	.011		15.10	85
	6.33	.93	18.80	6.50					.073			21.10	86
	7.76		6.92					.590				18.00	87
2.65	4.95	.09	21.60	6.61								20.50	88
1.89	2.81	.06	15.10	7.65				1.460		.591		10.50	89
2.41	4.52	.72	11.20	10.60								10.90	90
2.26	2.39		23.80	7.03						1.39		8.03	91
2.55	18.7	1.74	13.90	2.47						.421		10.70	92
3.08	5.60	.09	6.15	7.79								9.01	93
.82	1.14	1.02	22.30	3.56				.277		1.58		11.90	94
1.61	4.60	.52	25.00	19.50						.701		8.56	95
1.85	4.34		14.40	7.66				.524	.324			14.60	96
1.41	2.21	1.77	6.24	10.40	19.0	4.95	.148	.105	.414	.218		8.41	97
													98
	5.51	2.76	24.26						.264	.591		18.40	99
	2.98		3.06			4.31						22.20	100
	12.50	.64	12.90	5.91				1.700	.297	.081		3.96	101
													102
	3.06		65.70	2.69		5.10	.116					3.24	103
4.41	6.29	1.45	13.50	3.72				.291		.066		17.10	104
2.05	5.14		24.80	2.39				.671				19.90	105
3.78	1.95	1.45	5.77							1.42		17.20	106
3.67	4.48	.63	19.40	4.23			.045		.212			13.20	107
1.44	4.31	.81	20.90						.048	.341		11.30	108
3.24	2.25		13.90	9.31				.072		.661		9.56	109
1.64	6.95	.47	8.90	5.47				.315	.083	1.03		23.50	110
3.94	2.92		10.80									13.10	111
.55	7.38	.06	9.11					1.22		1.58		17.00	112
.36	5.31	.86	11.90	14.2								7.67	113
4.73	2.55	.85	4.74				.074	1.58				16.80	114
2.84	2.92		7.51	9.56				.412				20.20	115
3.18	2.38		15.20	5.59						2.47		9.73	116
2.72	6.08	1.94	14.60	3.84								10.40	117
.39	7.20	.79	14.10									12.90	118
	4.52	3.12	5.92						.085			19.90	119
1.86	10.9	1.63	8.12	5.31				.078		1.36		20.60	120
2.11	6.76		14.20			3.32		.412				15.70	121
3.10	9.95	.82	22.00	1.74						.019		19.90	122
1.45	5.01	1.53	22.00	5.36				2.410		.057		15.20	123
1.19	1.61	1.06	16.90	2.54								35.30	124
	10.8		28.40									11.40	125
6.42	6.01	.24	16.10	12.30				.475				2.92	126
2.43	7.55	.51	14.80	7.16						1.41		14.70	127
3.68	1.06		19.40				.078					35.40	128
2.84	9.15	.57	8.98	10.60				.114				7.07	129
1.76	6.95	.22	15.10	4.89		5.66				.523		16.10	130
	8.31		13.80	7.41					.169			11.91	131
8.15	2.05	.57	7.89									7.11	132
	4.77	1.82	26.20	14.10					.365	.717		19.50	133
1.66	3.53	1.12	6.61	6.44				.972		.168		30.00	134
1.41	2.94	1.74	17.90					.087				20.10	135

[1] the Department of Labor, September, 1901.

Showing percentages of total amount expended for maintenance and operation

All cities in the United States

	City.	Police department.	Police courts, jails, etc.	Fire department.	Health department.	Hospitals, asylums, etc.	Schools.	Libraries, art galleries, museums, etc.	Parks and gardens.	Sewers.	Municipal lighting	Street cleaning.
1	New York, N. Y.	9.90	1.27	4.60	1.13	4.61	19.17	.71	1.33	.41	2.65	2.82
2	Chicago, Ill.	16.55	1.11	7.40	.85	.06	36.85	.94	3.41	1.27	2.13	2.22
3	Philadelphia, Pa.	15.88	6.48	5.76	1.31	3.69	17.37	1.34	2.35	1.43	6.46	1.67
4	St. Louis, Mo.	18.38	1.33	8.82	1.77	7.57	17.51	.42	1.32	1.12	6.72	1.50
5	Boston, Mass.	8.01	5.16	5.87	.92	5.51	13.07	1.22	1.91	1.80	3.60	1.61
6	Baltimore, Md.	12.71	1.61	6.69	1.24	4.07	18.61	.54	2.73	.53	4.30	2.73
7	Cleveland, Ohio	8.69	2.42	10.15	2.06	2.99	26.17	1.72	1.62	1.04	5.39	1.30
8	Buffalo, N. Y.	13.52	.41	11.75	.81	2.31	19.81	1.68	3.41	.19	5.99	2.45
9	San Francisco, Cal.	13.39	2.75	11.17	1.14	4.38	19.81	.80	2.83	1.07	4.32	3.03
10	Cincinnati, Ohio	8.93	2.14	7.59	.69	3.83	18.12	1.38	.73	.52	5.48	3.75
11	Pittsburg, Pa.	9.07		10.34	1.59	2.73	15.60	2.33	3.01	.82	5.66	4.69
12	New Orleans, La.	5.38	.86	6.20	1.04	1.39	11.12	.23	.26	.88	5.03	2.44
13	Detroit, Mich.	13.36	.28	13.72	1.03	1.39	21.44	1.26	2.68	.90		3.98
14	Milwaukee, Wis.	9.17	.97	12.15	1.14	.26	20.49	1.77	1.42	2.58	5.63	2.95
15	Washington, D. C.	11.54	4.62	4.47	1.19	6.83	19.84	.15	1.37	2.30	4.13	2.96
16	Newark, N. J.	11.24	1.07	8.37	1.97	3.28	21.79	1.06	.12	1.87	5.71	3.65
17	Jersey City, N. J.	11.71		6.70	.23	.79	13.90	.87	.31	.58	4.48	1.87
18	Louisville, Ky.	9.86	3.83	8.28	.29	2.36	18.48		1.67	.54	5.44	3.92
19	Minneapolis, Minn.	7.36	1.15	11.05	.84	3.06	25.03	1.43	2.33	.71	5.26	1.39
20	Providence, R. I.	10.70	.15	10.30	.73	1.14	21.40	.64	1.36	2.09	8.40	1.73
21	Indianapolis, Ind.	9.93	.15	10.70	.92	2.24	32.70	1.57	3.60	.63	6.62	3.27
22	Kansas City, Mo.	9.30	.92	9.03	1.15	1.52	20.20	1.03	3.60	.82	2.87	3.30
23	St. Paul, Minn.	7.55	1.48	8.18	.43	1.01	23.93	.64	2.33	.68	5.47	6.19
24	Rochester, N. Y.	6.12	.48	7.43	.86	2.69	16.98	.13	1.05	.11	7.72	2.79
25	Denver, Col.	8.49	.59	8.22	1.35	1.84	35.93	1.28	3.71	1.05	4.86	2.20
26	Toledo, Ohio	7.02	1.36	7.40	.89	.02	25.33	.69	2.85	.80	4.92	2.83
27	Allegheny, Pa.	8.41		8.98	.95	4.57	22.13	1.93	1.72	.76		2.75
28	Columbus, Ohio	6.94	1.91	9.95	1.08	.89	23.55	.62	.65	.54	4.23	4.05
29	Worcester, Mass.	6.33		7.09	1.32	5.82	21.90	1.01	.95	9.85	5.16	1.78
30	Syracuse, N. Y.	6.00	.59	7.66	1.37	4.43	17.87	1.16	1.33		4.83	3.56
31	New Haven, Conn.	13.59	1.46	9.88	.54	5.41	26.34	.95	1.49	1.36	6.02	2.76
32	Paterson, N. J.	10.01	.28	9.78	.67	4.45	25.48	1.14	1.62	.91	7.08	2.79
33	Fall River, Mass.	8.64		7.62	1.58	9.09	20.20	.94	.11		6.19	1.44
34	St. Joseph, Mo.	6.79	1.00	6.79	.19	1.88	17.73	.86	.99	.02		.99
35	Omaha, Nebr.	6.32	.75	8.18	.58	.65	27.16	1.16	1.42	1.48	5.55	1.59
36	Los Angeles, Cal.	8.37	.51	8.48	.90	.98	33.75	1.29	4.20	.57	4.88	2.41
37	Memphis, Tenn.	11.10		1.00	7.26	3.71	15.40	.56	.32	.34	5.40	1.11
38	Scranton, Pa.	7.64	.49	7.50	1.12		41.40	1.30	.56	1.06	6.14	2.09
39	Lowell, Mass.	9.69		8.46	.86	7.66	23.58	1.17	.80	.88	6.61	2.01
40	Albany, N. Y.	10.77	.45	9.78	1.15	4.91	20.25	.66	3.10	1.02	6.20	.85
41	Cambridge, Mass.	5.95		4.22	.85	6.65	20.38	.96	.99	4.42	3.39	1.39
42	Portland, Ore.	5.59	.57	8.40	.59	.46	28.00		1.33	.52	5.18	4.09
43	Atlanta, Ga.	12.15		10.11	8.48	5.13	14.32	.60	1.16	.69	6.48	
44	Grand Rapids, Mich.	8.19	1.32	11.84	1.60	1.48	29.43	.74	2.26	.68		4.23
45	Dayton, Ohio	9.36	1.46	7.93	.91	2.26	33.70	1.11	.29	.21	5.58	1.95
46	Richmond, Va.	8.27	.33	7.34	.72	3.40	9.83	.05	.54	.79	2.71	2.72
47	Nashville, Tenn.	10.85	.59	10.80	1.62	2.88	20.60	.61			5.75	
48	Seattle, Wash.	7.64	.84	8.68	1.31	.76	23.56	1.67	1.77	1.05	2.96	1.51
49	Hartford, Conn.	8.29	.42	7.97	.79	5.51	26.45	.75	2.28	.97	4.01	3.01
50	Reading, Pa.	7.52		6.08	.70		30.70	.61	2.01	4.83	10.10	2.17
51	Wilmington, Del.	12.20	.46	5.44	.76	.01	29.10	1.05	1.59	1.31	6.81	2.02
52	Camden, N. J.	11.02	.72	10.30	.74	1.27	28.90	.23	1.84	.54	10.00	1.80
53	Trenton, N. J.	11.00	.35	9.12	.84	2.26	27.80	.71	1.86	.57	6.95	1.90
54	Bridgeport, Conn.	8.79	1.05	9.67	.61	8.72	23.00	1.59	2.45	1.08	7.13	3.58
55	Lynn, Mass.	6.61		7.93	.97	9.02	19.52	1.16	.74	.77	4.39	.69
56	Oakland, Cal.	8.94	1.05	10.50	1.96	.31	40.90	2.14	.72	.59	8.74	2.40
57	Lawrence, Mass.	8.03		7.34	1.81	8.81	22.93	1.46	.88	2.13	4.49	1.08
58	New Bedford, Mass.	11.14		7.73	2.97	6.68	23.08	1.37	2.26	.75	5.14	1.46
59	Des Moines, Iowa	6.84	5.96	10.90	.49	.36	36.70	1.52	4.07	1.58	6.65	2.28
60	Springfield, Mass.	5.81		8.37	.61	4.94	30.92	2.57	1.90	1.14	5.73	2.14
61	Somerville, Mass.	6.38		6.26	.78	3.93	28.39	1.62	.92	.98	5.62	1.51
62	Troy, N. Y.	11.02	.44	6.34	1.96	8.77	21.18		.23	.64	8.21	10.46
63	Hoboken, N. J.	13.06	.41	9.99	.81	1.85	22.51	1.02	.54	.69	3.31	1.93
64	Evansville, Ind.	8.61	.28	10.08	.37	.38	29.26		.28	.67	4.68	2.58
65	Manchester, N. H.	7.23	.44	14.06	2.05	3.28	19.90	.84	.83	.66	9.42	1.37
66	Utica, N. Y.	6.38	.37	11.65	2.03	2.63	26.04	.94	1.07	.59	9.66	3.56
67	Peoria, Ill.	9.12	2.15	8.98	.86	3.28	28.68	1.58	4.10	.75	5.02	2.42
68	Charleston, S. C.	14.78		7.94	1.96	10.66	12.76	.08	1.54	1.19	4.49	2.46

[1] Percentages obtained from data published in Bulletin 42 of the Department of

devoted to each of the municipal departments for the fiscal year 1901 [1]

above 30,000 population

Street sprinkling.	Other street expenditures.	Garbage removal.	Interest on debt.	Waterworks.	Gas-works.	Electric-light plants.	Docks and wharves.	Ferries and bridges.	Markets.	Cemeteries.	Baths.	Other items.	
.10	4.27	2.55	13.30	2.91			.84	.86	.07	.001	.09	26.47	1
	1.33	2.39	6.80	6.80		1.49	.10	.50	.02		.07	7.03	2
	2.35	3.59	7.48	7.40			.07	.53	.04	.01	.05	14.60	3
1.73	3.37	2.49	8.93	7.50			.66		.07			8.70	4
.75	7.49	2.84	15.49	2.79				2.02	.001	.32	.71	18.10	5
.01	2.46	2.17	20.32	5.18			.07	.27	.39		.10	13.20	6
	.99	2.15	14.83	5.71			.86		.44	.61		10.00	7
	2.02	1.99	11.29	7.44			.88	.13	.24	.002	.05	13.60	8
.24	1.87		.25					.11				32.80	9
	1.92	.43	27.94	7.72			.07	.57	.21			7.90	10
	3.12	1.73	17.54	4.29			.08	.43	.22			16.70	11
	.37	2.23	18.60					.001	.09			43.80	12
	8.59	1.60	8.19	1.40		2.66	.006	.19	.18			17.10	13
2.12	4.11	4.89	8.46	4.07			.47	1.63		.30		15.50	14
.05	6.22	2.04	9.63	5.42				.23	.12		.04	16.83	15
		1.83	21.02	6.04			.002	.10	.55		.12	10.20	16
	4.31		27.61	15.42			.12					11.10	17
	5.35		17.41	5.30			.31			.02		16.90	18
3.81	2.20	.04	12.78	4.54				.85			.16	16.00	19
	6.70	.83	18.50	3.93				.87		.71	.63	9.93	20
2.44	1.60	2.45	7.53	.17				.33		.55		13.20	21
.36	2.24	.70	11.80	6.81				.23		.11	.001	24.10	22
1.13		.84	16.54	4.04				1.75	.09			17.69	23
1.23	1.79	3.29	16.14	3.16				.71		1.06	.08	26.10	24
2.33	3.49	.20	7.09						.15			17.20	25
	4.65	.76	20.71	4.28	.16			1.56	.39	.62		12.70	26
	2.30	1.70	15.65	12.73		6.03	.21		.34			9.50	27
	6.20	.88	19.51	6.93				.03		.51		11.65	28
1.54	9.88	.76	18.21	2.15				.05		1.05	.02	4.60	29
1.00	3.32	2.87	12.88	4.70				.95	.31	.05	.23	24.90	30
1.92	5.57	.41	11.09				.005	.98				10.10	31
.32	3.33	2.44	12.40									17.20	32
.60	7.74	1.99	14.34	3.22						1.25		15.00	33
	6.68	.34	8.02			2.06		.05	.11			44.50	34
	3.08	.20	17.97									23.90	35
3.79	6.91	.83	4.70						.12			17.30	36
2.28	10.70		17.60				.79	1.64	.85			9.99	37
	6.66		7.43					.63				16.10	38
.72	3.86	2.38	12.44	6.70				.69		.57		10.88	39
	4.56	.02	15.00	8.50				.32	.18		.13	12.05	40
1.23	7.41	2.61	15.08	3.72				.99		.84	1.01	18.90	41
	1.10	.47	31.70	3.62				.88				7.54	42
	8.05		12.31	9.63				.10		1.06		9.65	43
	1.20	.60	8.79	5.74		2.27		.50	.19	1.59		17.28	44
.07	2.02	2.29	18.30	4.34			.04	1.21	.54			6.37	45
.12	4.39	1.60	29.78	2.69	10.82			.34	.53	.71		12.24	46
1.47	6.27	4.32	19.60	7.25					.29			7.07	47
	2.76		24.60	5.79			.23	.004				14.71	48
1.57	8.40	1.70	12.88	5.23				.93		.31	.14	8.32	49
	6.11	2.49	8.89	6.43					.17			11.30	50
	5.57	4.21	12.00	8.35							.05	8.95	51
	3.46	1.21	14.98	7.10								7.37	52
	1.91	2.31	18.20	6.10								8.18	53
.96	6.99	3.39	9.18					.75				11.20	54
1.77	6.53	2.96	16.74	6.30						2.37		11.46	55
2.05	3.13		3.26				1.10					12.20	56
1.43	3.73	3.70	12.11	11.07				.90		1.32		6.75	57
	5.51	2.35	15.27	3.54			.57	.01		3.18	.08	6.84	58
	1.41	.13	6.88					2.19		1.09	.11	16.20	59
2.33	7.02	1.99	12.05	3.76				.17			.05	8.34	60
	8.06	3.08	4.71	4.99								22.72	61
.75	1.10	2.92	8.13	7.60				.02	.11	.07	.01	9.98	62
	.20	1.06	7.84	19.35				.77		.61	.18	14.59	63
1.18	.89	.83	17.38	9.59			.25	.16	.19	2.06		10.21	64
.57	7.35	2.76	13.00	4.93				.77		1.98		8.56	65
	1.11	3.52	5.09					1.73			.17	23.44	66
	2.71	.09	7.39					1.11				21.71	67
.25	2.74	3.90	25.66						.51			9.08	68

[1] Labor. September, 1902.

Showing percentages of total amount expended for maintenance and operation

All cities in the United States

	City.	Police department.	Police courts, jails, etc.	Fire department.	Health department.	Hospitals, asylums, etc.	Schools.	Libraries, art galleries, museums, etc.	Parks and gardens.	Sewers.	Municipal lighting.	Street cleaning.
69	Savannah, Ga.	14.17	.01	12.45	2.91	2.90	(b)		1.41	.79	5.99	2.47
70	Salt Lake City, Utah.	5.11	.71	5.45	.67	1.26	33.49	.72	.99	.44	3.95	1.86
71	San Antonio, Tex.	8.78		8.19	2.78	1.34	20.12		2.37	.63		3.27
72	Duluth, Minn.	4.11	1.38	8.72	.60	1.32	24.02	.85	.86	.86	2.34	.38
73	Erie, Pa.	6.96	.40	11.91	1.51		31.12	1.53	.83		8.42	1.23
74	Elizabeth, N. J.	11.26	.14	5.41	1 42	4.17	26.69			.46	4.77	
75	Wilkesbarre, Pa.	9.44	.28	9.66	.86		38.80		.13	1 92	10.80	
76	Kansas City, Kans.	9.53	.95	7.31	4.18		21.20	.31	.23	.73	6.03	2.45
77	Harrisburg, Pa.	6.83		4.47	5.68	.06	35.20		.77	.22	7.54	.76
78	Portland, Me.	6.10		8.76	.61	5.14	20.10	.88	.61	3.55	5.40	2.74
79	Yonkers, N. Y.	9.68	1.04	5.86	2.95	.69	24.90	.53	2.85	.46	4.77	2.04
80	Norfolk, Va.	7.29	.01	5.52	3.17	1.48	6.96	.18	1.15	2.32	1.96	4.23
81	Waterbury, Conn.	9.77	1.13	8.21	.63		42.49	.65	.89	1.58	5.40	2.30
82	Holyoke, Mass.	6.11		9.26	.84	6.38	24.89	.76	.94	.39	3.81	1.07
83	Fort Wayne, Ind.	8.78		15.34	1.32		30.71	1.40	2.92	.59	7.99	2.89
84	Youngstown, Ohio.	10.73	.72	8.49	1.52	3.28	34.93	.69	.37	1.17	5.88	4.86
85	Houston, Tex.	7.79		9.28	3.39		18.24		.28	.48	3.17	
86	Covington, Ky.	8.22	1.53	7.12	3.45	3.86	19.70			.70	4.25	1.85
87	Akron, Ohio.	8.52	.75	10.86	.01	2.12	44.16	2.44	.44	.39	7.20	1.37
88	Dallas, Tex.	8.36	1.26	10.72	4.28		19.08	.75	.61	.02	5.12	2.27
89	Saginaw, Mich.	7.88	.66	7.19	.64	3.41	34.00	.58	.13	.24	4.30	2.08
90	Lancaster, Pa.	6.43		6.13	.61	.56	35.66			.33	11.02	2.29
91	Lincoln, Nebr.	4.46	.43	8.23	.95	.08	33.41	1.25	.02	.70	3.91	.96
92	Brockton, Mass.	6.68		8.61	1.65	6.16	22.10	1.05		1.83	5.14	1.09
93	Binghamton, N. Y.	6.54	.41	5.98	1.29	2.99	35.30	.43	.72	.59	10.20	2.38
94	Augusta, Ga.	11.02	1.05	10.11	1.47	4.26	17.91		.18	.87	4.58	.32
95	Pawtucket, R. I.	7.03		5.79		3.23	20.30	1.08	.36	1.67	5.01	2.16
96	Altoona, Pa.	6.36	.25	8.75	.71		32.20		1.11		5.99	1.79
97	Wheeling, W. Va.	8.39	1.42	9.65	.95	.52	21.54	1.15		.21		2.20
98	Mobile, Ala.	13.86	.40	8.60	.71	3.57	16.48		.65	.98	6.59	1.77
99	Birmingham, Ala.	10.90	3.44	9.28	.85	1.41	12.30		.99	.14	4.18	
100	Little Rock, Ark.	15.54		14.44	.97	3.99	38.41		1.82	.54		
101	Springfield, Ohio.	7.31	1.06	6.78	.84	2.37	27.53	1.00	2.09	.40	8.94	
102	Galveston, Tex.	8.80		11.30	4.20	6.19	21.10	.30	.04	.52		
103	Tacoma, Wash.	5.04	.39	6.72	.60	.43	23.49	.73	.98	1.86		
104	Haverhill, Mass.	5.73		8.50	.63	6.91	21.28	1.09	1.28	.55	6.36	.80
105	Spokane, Wash.	6.59	1.10	12.28	.99	1.36	28.73	.56	1.04	.29	2.03	.93
106	Terra Haute, Ind.	7.54	.24	9.96	1.94	.11	34.51	2.09	.52	.29	6.83	3.10
107	Dubuque, Iowa.	7.63		8.87	.48	.32	25.92		.29	1.30	6.62	3.77
108	Quincy, Ill.	7.65	1.97	10.31	1.29		29.93	1.57	2.28	.82	7.19	1.50
109	So. Bend, Ind.	6.90		11.00	.22		26.70	1.50	.96	.73	6.58	6.20
110	Salem, Mass.	6.97		6.39	2.66	8.59	21.18	1.34	1.14	.58	6.68	1.05
111	Johnstown, Pa.	7.92	.27	4.57	.50		46.80		.69	1.12	8.26	3.65
112	Elmira, N. Y.	7.44		11.50	1.62	2.18	27.60	.42	1.42	2.28	7.92	.79
113	Allentown, Pa.	5.58		8.04	.79		39.74				8.46	.65
114	Davenport, Iowa.	7.65		7.30	1.32		43.80	.11	2.16	.53	2.79	2.80
115	McKeesport, Pa.	10.15		9.71	.95		30.48	.87		.44	5.92	2.61
116	Springfield, Ill.	8.60	1.15	11.90	.60		28.20	.79		.59	6.04	3.69
117	Chelsea, Mass.	5.32		5.21	2.54	8.02	18.86	.59	.21	.67	4.22	.75
118	Chester, Pa.	9.90		6.22	1.78		36.90		.99	.79	8.92	.40
119	York, Pa.	10.18		6.85	1.94	.14	37.69		.16		11.32	
120	Malden, Mass.	5.96		6.05	2.26	7.01	28.10	1.73	.24	.12	5.27	
121	Topeka, Kans.	7.81	.67	8.75	2.95	.54	31.67	1.88	1.69	.42		2.42
122	Newton, Mass.	6.76		5.39	1.78	4.24	18.92	1.52	.38	.40	5.53	2.21
123	Sioux City, Iowa.	5.19	.35	6.72	1.20		27.99	.59	.28	1.68	3.96	1.52
124	Bayonne, N. J.	8.48	.16	2.84	1.33	.68	28.33	.87		.51	6.45	1.37
125	Knoxville, Tenn.	8.67		8.79	.69	3.54	19.93				9.59	
126	Schenectady, N. Y.	7.52	.39	7.56	5.71	2.67	20.57		.15	1.11	8.75	1.83
127	Fitchburg, Mass.	6.99		6.23	.92	9.28	22.35	1.39	.54	1.02	6.35	.98
128	Superior, Wis.	6.34	.56	9.19	2.17	3.35	29.24	1.04		.43	2.95	4.55
129	Rockford, Ill.	5.69	.56	9.94	.65	.39	36.06	2.19	.24	1.25	7.21	3.26
130	Taunton, Mass.	8.66	.22	5.92	.87	7.17	25.02	1.27	.25	.74	1.74	1.83
131	Canton, Ohio.	7.24	.86	11.04	1.25	.99	33.35	.72	.72	2.10	7.79	
132	Butte, Mont.	11.75	1.49	7.59	2.43		34.70	2.36		.05	4.47	2.08
133	Montgomery, Ala.	11.45		7.84	2.76	.46	10.26				5.54	5.80
134	Auburn, N. Y.	6.97	.52	7.15	1.06	5.73	27.99	.69			10.45	2.62
135	Chattanooga, Tenn.	12.31		13.26	5.38	2.53	17.85	.20	1.59	.16	2.41	1.87
136	E. St. Louis, Ill.	10.47	.80	8.71	1.59		25.64	1.86		.82	5.15	12.62
137	Joliet, Ill.	11.98		12.23	1.87	.84	27.62	1.59	2.25	.59	6.86	2.86

[1] Percentages obtained from data published in Bulletin No. 42 of the Department of

(b) No data for school expenditures.

evoted to each of the municipal departments for the fiscal year 1901 [1]

bove 30,000 population

Street sprinkling.	Other street expenditures.	Garbage removal.	Interest on debt.	Waterworks.	Gas-works.	Electric-light plants.	Docks and wharves.	Ferries and bridges.	Markets.	Cemeteries.	Baths.	Other items.	
.19	6.63	6.81	25.57	4.60			.09		.83	.89		11.30	69
3.17	2.55	1.28	21.31	4.73						1.14		11.14	70
.90	13.40	2.60	22.16									13.50	71
.74	3.95		28.12	3.62	3.48			2.31	.07			12.22	72
	2.81		8.69	14.17			.16	.12				10.09	73
	5.65	1.49	26.92									11.60	74
	10.30		6.56							.55		10.80	75
	2.94		25.84					1.47		.06		16.72	76
	8.05	.13	12.80	6.44				.02				11.00	77
	6.85	.55	11.90					1.33		3.51	.03	22.00	78
.89	2.94	3.77	19.50	6.58				.08	.23		.28	9.84	79
.13	5.12		29.45	7.52				.40	.05	1.00		22.01	80
	3.60	3.77	14.50	4.11								1.33	81
1.15	2.00	2.16	11.77	3.51				.22			.07	24.64	82
.04	2.47	1.99	6.43	6.59				.43	.08			9.99	83
	2.22	.31	7.93	6.17								10.76	84
	8.54	2.69	22.32	4.84				.03				19.29	85
	5.89		18.44	8.64					.02			16.29	86
1.45			5.69					.49				14.14	87
.62	4.79	.36	23.29	7.04								10.59	88
	6.40	.73	13.50	6.11			.12	1.39		1.12		10.20	89
	5.71	2.49	9.90	10.37								8.50	90
	2.55	.13	24.92	6.81				.31		.79		10.06	91
1.57	12.60	1.26	14.40	2.55						.45		12.90	92
.15	4.52		4.30	6.58				.27				17.40	93
.40	1.08	.95	18.99	6.11				.39		1.46		18.89	94
1.30	3.67	.54	26.60	9.02				.03		1.05		11.50	95
	4.78		13.80	7.66				.20	.31			16.10	96
	.23	1.95	5.99	11.66	18.25	5.19			.48	.32		9.84	97
	9.52		13.35	8.29			.43		1.36	1.42		12.07	98
	7.22	4.03	28.91					.28		.51		15.55	99
	5.89		2.79			4.99				.54		10.07	100
	11.73	.65	13.06	4.77				1.41	.67	.08		9.23	101
	5.48		20.00	6.47		5.14			.05	.41		10.10	102
	3.83		32.69	4.69		9.91	.35					8.32	103
1.56	7.37	.47	21.23	3.46				.45		.07		11.36	104
.74	2.90		26.41	2.87				.70				10.43	105
.12	2.29	1.32	5.30							1.25		22.50	106
	7.06	.61	17.70	5.31					.02			13.85	107
	3.03	.89	17.58						.04	.35		13.52	108
	6.08		12.10	9.11				1.16		.55		10.40	109
.74	8.40	.47	9.42	6.18				.29	.11	1.18		16.36	110
	2.28		12.80					.36	.09			10.80	111
	6.50		5.65					1.25		1.79		21.60	112
	4.30	1.29	13.52	11.00								6.61	113
2.54	3.15	1.38	5.08					1.41				17.91	114
	2.56	.44	8.98	8.64								18.21	115
	2.11		13.80	6.99						2.88		12.60	116
1.39	4.20	1.39	8.71	2.38								35.47	117
	4.82	.79	12.80									15.70	118
	7.77	7.25	9.70						.07			7.28	119
1.68	10.97	1.82	8.60	6.19						1.48		13.54	120
.06	7.65	.18	16.00			4.07		.11				13.08	121
1.44	12.45	1.01	25.37	1.72						.02	.04	10.79	122
	8.06	1.88	23.63	5.38				2.39		.09		9.05	123
.08	1.15	1.31	20.13	2.35			.04					23.55	124
	6.74		28.56									13.46	125
.37	5.28		12.70	12.91				.39				12.03	126
.87	8.57	.57	16.58	6.22				1.59		1.22		8.29	127
	22.45							.60				17.06	128
	6.23	.62	8.33	9.98				.38				6.95	129
	7.06	.24	17.47	5.11		6.32				.46		9.63	130
	.66		12.43	10.49					.01			10.31	131
2.31	6.59	.52	6.66									16.95	132
		1.65	30.85	15.36					.42	.91		6.67	133
	6.61	1.34	7.60	6.81						.23		14.17	134
.09	7.47	2.48	18.30					.70				12.99	135
	13.59											18.39	136
	11.75	1.29	3.40	6.23								8.58	137

[1] Labor, September, 1902.

Before subjecting to interpretation the gross amounts of expenditures for 1900 and 1901 for the various items, certain minor corrections of these amounts were made, with the aid of the explanatory notes accompanyng the tables. Wherever an amount not properly belonging to the municipal accounts, as, for instance, expenditures in which the city acted as agent of the county in fulfilling some function of county government, had been included in the gross expenditures, such amounts were deducted. Wherever an amount properly belonging to the municipal budget had not been included, it was added to the amount of the gross expenditures. These additions were practically all due to amounts expended by state and county upon public schools. The total number of corrections was very small—not over six or eight on either of the two tables.

Transformation of Gross Itemized Expenditures to a Percentile Basis.—The first operation was to transform the gross itemized expenditures to a percentile basis. This process, even by the use of indispensable labor-saving devices, was of necessity a long and tedious one. These transformed percentile amounts are contained in Tables 1 and 2 (pages 18–25) and form the immediate basis for the operations which are described later on.

The primary advantage of making comparisons on a percentile basis rather than on one of gross or per capita amount consists in placing, as it were, all cities whether large or small in the same category, thus giving a definite series of comparable statistics for the city as a *type*. The apparent disadvantage consists in a chance of placing the so-called expensive, efficient, and well-governed city in the same class with the parsimonious and possibly inefficient and undesirable community. For example, one of two cities of about equal size might have a budget of twice the amount of the other; it might spend twice as much as the other on its schools, fire, health, street, and police departments. On the percentile basis these two cities would be placed on an equality. The necessary provisions for correcting this disadvantage will be explained as the occasion renders it necessary in the interpretation of the results.

V. Variability of Expenditures

General Statement.—Even a superficial examination of the tables, giving the itemized percentile expenditures, discloses a

remarkable range in the percentile amounts in the identical municipal departments of the different cities. This variability is not confined to cities of great differences in population or location. Even within a comparatively small population or territorial group, a wide divergence in the percentile distribution of the total amount of the budget among the various items is prominent.

The percentile expenditures assembled from the data of Table 1, and given in Table 3 are illustrative of this divergence. The cities concerned were selected at random. Cities 7, 8, and 9 are cities of from 350,000 to 400,000 population, located respectively in the eastern, central, and extreme western portions of the country. Cities 36, 37, and 38 are respectively eastern, southern, and western communities, and are each of approximately 100,000 population. Cities 81, 95, 120, and 126 are New York or New England cities of from 30,000 to 50,000 population.

TABLE No. 3

Typical examples of variability of percentile expenditures. Statistics for year 1900. (Read across)

City No.[1]	7	8	9	36	37	38	81	95	120	126
Police Department, Courts, Jails, etc..	10.55	13.51	16.78	10.28	11.20	8.57	9.92	6.80	5.23	11.13
Fire Department....	9.83	11.00	9.88	9.14	9.41	7.39	7.66	5.40	5.39	6.36
Health Department.	1.54	.72	1.66	.91	7.46	.71	.71		2.58	1.82
Hospitals and Charities.....	2.73	2.60	3.82	.29	3.55			2.62	6.35	2.37
Schools.....	23.70	19.10	20.90	32.70	15.90	48.60	39.50	17.70	21.90	24.50
Libraries and Museums.....	1.65	1.65	.75	1.39	.70	1.42	.24	.99	1.53	.61
Parks.....	.79	3.21	2.66	4.08	.23	.64	.24	.11	1.23	.17
Sewers.....	.69	.20	.82	.31		1.03	1.18	1.46	1.42	1.48
Municipal Lighting..	5.15	5.79	3.94	3.27	5.17	6.37	5.18	4.51	4.63	7.12
Street Cleaning.....	1.20	2.98	2.70	6.49	3.06	1.85	2.01	1.61	1.86	6.42
Other Street Expenditures.....	1.99	4.02	3.13	5.91	10.30	2.06	2.24	4.60	10.90	6.01
Garbage removal....	1.50	1.86		.82		.43	1.65	.52	1.63	.24
Interest on debt....	14.40	10.90	.25	4.89	18.60	8.06	12.60	25.00	8.12	16.10
Waterworks.....	5.89	5.86					4.56	19.50	5.31	12.30
Gas-works.....										
Electric-Light Plants										
Docks and Wharves.		.76			.76					
Ferries and Bridges.	2.25	.18	.10		2.35	.69			.08	.47
Markets.....	.45	.23			.67					
Cemeteries.....	.65	.01						.70	1.36	
Baths, etc.....		.02								
Other items.....	15.10	15.40	32.50	19.40	10.60	12.30	12.20	8.56	20.60	2.92
Total.....	100.06	100.00	99.79	99.88	99.96	100.12	99.89	100.08	100.12	100.02

Tables of Frequency.—The data of Table 4 present the so-called tables of frequency for certain items of expenditure, for which complete and fairly reliable information was given in the

[1] For names of cities, consult Table 1, pp. 18–21.

original tables for all, or approximately all, of the cities. These items were selected for study because they pertained to important municipal functions, and also because the original data, from which the percentile data were developed, presented these expenditures in a clear manner, free from apparent admixture with other items.

TABLE No. 4

Tables of frequency. Percentile expenditures for maintenance and operation
All cities in the United States above 30,000 population
Fiscal years 1900 and 1901

Per cent.	(a) Police Department. Frequency. 1900	Frequency. 1901	Average. 1900–1901	(b) Police Department, Police Courts, Jails, Workhouses, Reformatories, etc. Frequency. 1900	Frequency. 1901	Average. 1900–1901
2	1	0	0	0	0	
3	2	0	2	1	0	
4	3	2	3	4	1	
5	13	10	10	15	9	
6	15	24	19	13	21	
7	23	19	17	16	16	
8	14	22	22	22	23	
9	16	14	13	17	15	
10	3	7	6	10	11	
11	8	10	9	8	16	
12	6	2	3	4	6	
13	4	6	4	10	6	
14	3	1	1	5	4	
15	0	1	1	1	3	
16	1	1	0	4	2	
17	1	0	1	0	1	
18	0	1	1	0	1	
19	1			2	1	
20				1	0	
21					0	
22					1	
Total,	114	120	112	133	137	

Per cent.	(c) Fire Department. Frequency. 1900	Frequency. 1901	Average. 1900–1901	(d) Street Lighting. Frequency. 1900	Frequency. 1901	Average. 1900–1901
Below 1	0	0	0	1	0	
1	0	0	0	5	2	
2	1	1	1	7	12	
3	2	0	0	14	9	
4	5	5	7	25	24	
5	16	12	14	25	33	
6	17	16	14	20	24	
7	21	23	23	13	10	
8	18	28	23	10	9	
9	20	17	22	5	3	
10	13	15	12	2	5	
11	9	11	8	3	2	
12	4	4	4			
13	4	2	1			
14	2	2	3			
15		1				
Total,	132	137	132	130	133	

On account of the very small difference in variability between the two years (median, 1900, 8.82; 1901, 8.88) the *average* percentile expenditures were not calculated.

TABLE NO. 4 (*Continued*)

Tables of frequency. Percentile expenditures for maintenance and operation. All cities in the United States above 30,000 population
Fiscal years 1900 and 1901

(e) Schools. Per cent.	Frequency. 1900	Frequency. 1901	Average. 1900–1901	(f) Libraries, Museums, Art Galleries. Per cent.	Frequency. 1900	Frequency. 1901	Average. 1900–1901
6	1	1	1	Below .1	4	2	
7	1	0	0	.1	3	4	
8	0	0	1	.2	2	3	
9	0	1	0	.3	9	2	
10	3	1	2	.4	6	3	
11	1	1	0	.5	7	7	
12	1	2	2	.6	8	11	
13	2	2	1	.7	5	9	
14	1	1	3	.8	6	8	
15	5	2	1	.9	2	5	
16	3	2	2	1.0	11	10	
17	10	6	8	1.1	7	7	
18	7	6	6	1.2	4	6	
19	3	9	8	1.3	4	6	
20	7	10	8	1.4	5	3	
21	11	10	7	1.5	4	9	
22	6	5	5	1.6	4	3	
23	7	7	7	1.7	6	4	
24	6	3	9	1.8	3	2	
25	8	6	10	1.9	2	1	
26	4	6	6	2.0	1	1	
27	3	7	3	2.1	0	2	
28	6	8	5	2.2	0	0	
29	1	5	3	2.3	2	2	
30	3	4	3	2.4	1	1	
31	4	2	2	2.5	0	1	
32	4	2	2	2.6	0		
33	3	5	4	2.7	0		
34	5	4	5	2.8	1		
35	4	4	4				
36	2	4	5	Total,	107	112	
37	3	1	1				
38	1	2	2				
39	3	1	2				
40	1	1	1				
41	0	1	1				
42	0	1	0				
43	0	1	0				
44	0	1	0				
45	1	0	1				
46	0	1	1				
47	0						
48	1						
Total,	132	136	132				

On account of the very small difference in variability and central tendencies between the two years (median, 1900, 1.02; 1901, 1.015) the *average* percentile expenditures were not calculated.

TABLE NO. 4 (*Continued*)

Tables of frequency. Percentile expenditures for maintenance and operation
All cities in the United States above 30,000 population
Fiscal years 1900 and 1901

Per cent.	(g) Health Department. Frequency. 1900	Frequency. 1901	Average. 1900–1901	(h) Parks. Frequency. 1900	Frequency. 1901	Average. 1900–1901
Below .1	1	1	0	2	2	
.1	1	1	0	10	8	
.2	2	3	3	9	12	
.3	4	1	2	2	5	
.4	9	4	8	6	1	
.5	9	4	7	6	5	
.6	6	14	11	5	5	
.7	14	10	8	3	6	
.8	8	15	10	5	6	
.9	15	12	11	8	10	
1.0	5	4	9	2	3	
1.1	4	7	8	4	4	
1.2	9	6	3	5	1	
1.3	7	8	5	4	6	
1.4	3	3	6	2	5	
1.5	2	5	4	3	3	
1.6	4	4	9	0	4	
1.7	0	3	3	6	2	
1.8	6	2	2	4	2	
1.9	2	5	2	3	2	
2.0	2	3	1	1	2	
2.1	0	1	0	3	1	
2.2	2	0	0	1	5	
2.3	2	0	1	1	4	
2.4	1	1	2	2	1	
2.5	3	1	1	4	0	
2.6	1	1	2	3	1	
2.7	0	2	2	0	1	
2.8	0	0	2	3	3	
2.9	1	4	0	0	1	
3.0	1	0	0	1	1	
3.1	0	1	0	0	1	
3.2	0	0	1	2	0	
3.3	0	1	1	1	0	
3.4	0	1	1	0	2	
3.5	0	0	0	0	0	
3.6	0	0	0	1	2	
3.7	0	0	1	0	1	
3.8	0	0		0	0	
3.9	0	0		0	0	
4.0	0	0		1	1	
4.1	0	1		0	1	
4.2	0	2		0	1	
4.3	0			0		
4.4	1			1		
Also: at 5.8	1	Also: at 5.3 1 " 5.6 1 " 5.7 1 " 7.2 1 " 8.4 1		Total, 114	121	
Total,	126	136	126			

On account of the very small difference in variability and central tendencies between the two years (median, 1900, 1.045; 1901, 1.05) the *average* percentile expenditures were not calculated.

Explanation of Tables of Frequency.—Table 4(*a*) contains the facts of the distribution of the percentile expenditures for the police department. Column 1 gives the range of percentile expenditures; column 2 gives the number of cities, in accordance with the statistics of Table 1, spending any certain per cent. of their gross expenditures for the maintenance and operation of the police department for the year 1900.[1] Column 3 gives similar information for the year 1901; column 4 represents the average percentile expenditures for the years 1900 and 1901. The totals are of the number of cities for which information is given for any year. Thus the first line of Table 4(*a*) would read as follows: In 1900, one city spent 2 %[2] of its gross expenditures for maintenance and operation upon its police department; no city spent this per cent. in 1901; and there were no cities with an average percentile expenditure of 2 % for the police department. The fourth line of this table would read as follows: In 1900, 13 cities each spent 5 % of their gross expenditures for municipal maintenance and operation for the maintenance and operation of police service; in 1901, 10 cities each spent this per cent.; according to the average of the two years, 10 cities spent this per cent.

Table 4 (*a*) does not contain the data for all the cities. This was due to the fact that many cities do not separate in their accounts the expenditures for the police department from those incurred by reason of jails, police courts, etc. The data for this combined item are presented in Table 4(*b*).

The remaining divisions of the table are similar in nature to division (*a*) and need no further explanation.

Graphical Representation of Variability.—Figures 1 to 10, pp. 32–34, represent diagrammatically the tables of frequency. In the case of those items for which an *average* percentile expenditure has been calculated, the diagrams reflect the numerical facts of this average. Where no average has been calculated

[1] Throughout these explanations the year 1900 has reference to the data contained in the Bulletin 36 of the Department of Labor, published in September, 1901; the year 1901, to Bulletin 42, published in September, 1902.

[2] Throughout all the tables of frequency, any percentile figure must be read to mean from that figure to the next higher one. Thus 2 % really means a point between 2 % and 3 %; 3 %, a point between 3 % and 4 %, etc.

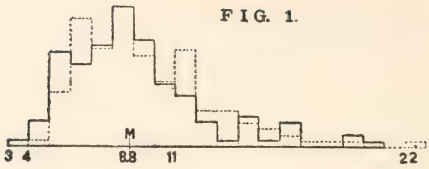


FIG. 1.

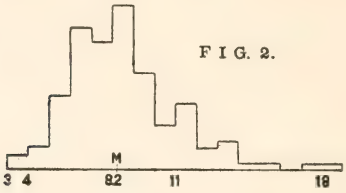


FIG. 2.

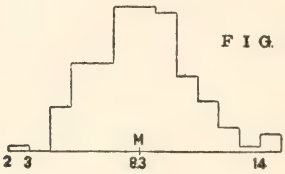


FIG. 3.

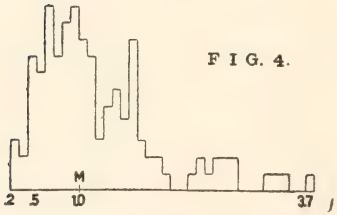
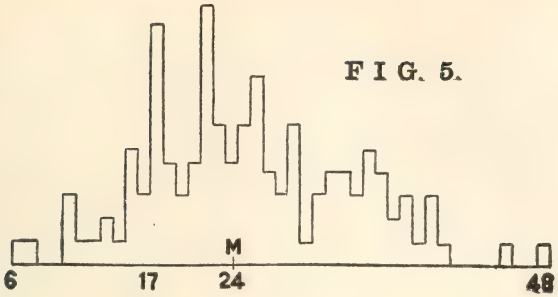
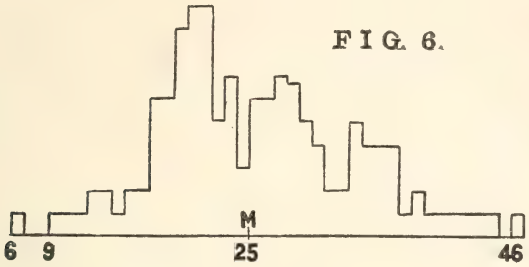


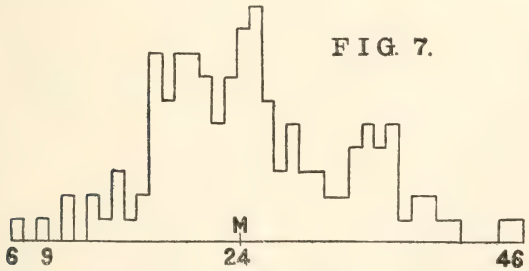
FIG. 4.

SURFACES OF FREQUENCY—PERCENTILE EXPENDITURES

Fig. 1.	Police Department, Police Courts, Jails, etc. (Heavy line) 1900, (Dotted line) 1901.	Median, 8.8.
Fig. 2.	Police Department. Average of 1900 and 1901.	Median, 8.2.
Fig. 3.	Fire Department. Average of 1900 and 1901.	Median, 8.3.
Fig. 4.	Health Department. Average of 1900 and 1901.	Median, 1.03.







SURFACES OF FREQUENCY—PERCENTILE EXPENDITURES

Fig. 5.	Schools, 1900.	Median, 23.6.
Fig. 6.	Schools, 1901.	Median, 24.96.
Fig. 7.	Schools, average 1900 and 1901.	Median, 24.3.

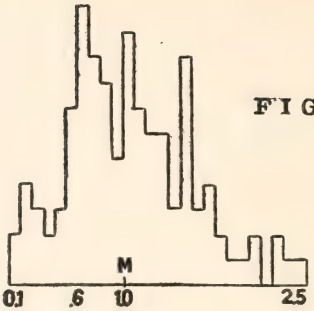


FIG. 8.

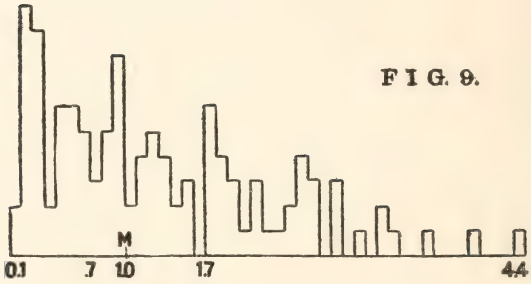


FIG. 9.

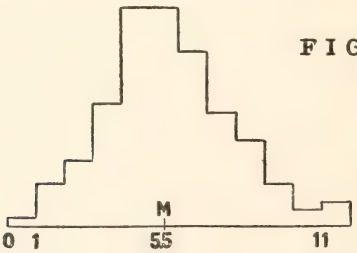


FIG. 10.

SURFACES OF FREQUENCY—PERCENTILE EXPENDITURES

Fig. 8. Libraries, Art Galleries, and Museums, 1901. Median, 1.01.
Fig. 9. Parks and Gardens, 1900. Median, 1.04.
Fig. 10. Municipal Lighting, 1900. Median, 5.5.

the frequencies of both years are presented, the heavy continuous line representing the frequencies for the first year, and the broken line the frequencies for the second year. In the case of the expenditures for schools the three sets of frequencies are represented separately. The horizontal distance represents in every case the per cents., while the vertical distance represents the number of cases.

These graphical representations enable one to comprehend at a glance some of the more significant characteristics of the tables of frequencies, which are often concealed from the unaccustomed observer in the distribution series of Table 4.

VI. Measurement of Variability

In their present distributed and graphically represented condition, the measures entering into the tables of frequency merely give us an index to the principal, gross facts, viz., the *spread* of the measures. That is, we know that, of the cities studied, some spend 3 %, some 4 %, some 5 %, and so on, until we find one city spending 18 % [1] of its total expenditures for the maintenance of its police service (Table 4(*a*)). If the expenditures for the police department, police courts, jails, etc., are placed in a single amount, this variation is found to be from 4 % to 22 % of the gross total (Table 4 (*b*)). For schools, we find it to be from 6 % to 46 % of the gross total (Table 4 (*e*)). These facts, while perhaps interesting enough in themselves, give us but a partial insight into the true condition of affairs. As they now stand, they do not enable us to describe with any exactness the character of the different variabilities, nor to state any of the definite relations which may exist between the different items of expenditure.

There are at least three methods of attaining some definite and comparable measures of the variability.

Method of the Probable Error.—By the first method, the extreme cases, *i.e.*, those very high and those very low, may be excluded. Excluding in this manner from our tables of frequency the low 25 % and high 25 % of the cases under each

[1] It is evident that the figures in the column of *average* percentile expenditures are more reliable, and more nearly indicative of the real measures, than the percentile expenditures for any one year, hence wherever possible in these explanations the *average* figures have been used.

item, there would remain a middle 50 %. It is evident that the limits of this middle 50 % of the cases give a truer measure of the variability of the group of cities in any single item of expenditure than the limits within which all the cases lie. This is particularly true with such items as schools, libraries, health, and parks, in which a wide range of variability is exhibited.

Actually performed, and calling the new limits + and − P. E. (Probable Error), the following table of results would be found:

TABLE 4A

Table of measures of variability of percentile expenditures for maintenance and operation. All cities in the United States above 30,000 population. Fiscal years 1900 and 1901

	50 % of the cases lie between			2 P. E.
Police Department (average)	6.93 %	and	9.82 %	1.89
Police Department, Courts, Jails, etc. (1901)	7.43	"	11.22	3.79
Fire Department (average)	6.72	"	9.70	2.98
Municipal Lighting (1901)	4.39	"	6.72	2.33
Libraries, Museums, etc. (average)	.66	"	1.40	.74
Health Department (average)	.7	"	1.6	.9
Parks (1901)	.54	"	1.90	1.36
Schools (average)	19.65	"	30.58	10.97
Interest on Debt (average)	8.84	"	19.15	10.31

In other words, while the cities in 1901 exhibit a variability of 19 % (from 4 % to 23 %) in their expenditures for police department, courts, jails, etc. (Table 4 (*b*)), one half of these cities lie within a variation of but 3.5 % (from 7.5 % to 11 %). Also while the *average* percentile expenditures for two years of 132 cities for schools exhibit a variability of 40 % (Table 4 (*e*)), one half of these cities lie within a variation of but 11 % (from 19.65 % to 30.58 %). Although, from the data at hand, it would be entirely correct to say that, among American cities having 30,000 or more population, the expenditures for schools varied from 6 % to 46 % of the total expenditures for maintenance and operation, such a statement would be manifestly unfair as defining the essential characteristics of the group.

Method of Deviation from Central Tendency.—The second method of measuring the variability of expenditures in any item is by means of the amount by which each member of the group of cities deviates from some central tendency, such as the average or the median. The median is the point above and

below which 50 % of the cases lie. By reason of its lack of ambiguity and less likelihood of being influenced by extreme cases, the median is preferable to the average under conditions such as the present.

Table 5 contains the medians, and the deviations from the medians, of the *average* percentile expenditures for 1900 and 1901, for the eight indicated items. The first line of the table contains the average *median* expenditure for the designated items. That is to say, one half of the cities spent *more* than 8.20 % of their total expenditures for police service; one half of the cities spent *less* than 8.20 %. The average median expenditure for schools was 24.31 %; and so on. Opposite the number of each city is placed the amount by which the percentile expenditure of that city for any particular item deviates, above or below the median percentile expenditure for that item. For example, city 22 had an average percentile expenditure for schools of .96 % below the average median percentile expenditure of the entire group of cities. All deviations below the median are indicated by a minus sign. All deviations without the sign are to be interpreted as plus.

Having thus obtained the individual measures of the deviations, it is possible to combine these measures and reach certain conclusions regarding the character of the deviations for the entire group. Such group measurements would be the average amount of the deviation, *i.e.*, the sum of all the deviations divided by the number of each; or the limits within which lie the deviations of one half of the cities from the central tendency of any item of expenditure; or a more accurate measure yet of this group deviation, the square root of the average of the squares of the deviations of the individual measures from their median—the so-called mean square deviation, or standard deviation.

As these measures are concerned more directly with the methods of calculating the group relationships, an explanation of their meaning and importance will be reserved for the section on correlation. The main observation to be made here is the necessity of utilizing some definite measures of the amount of the deviation of the expenditure for any item from the central tendency of that expenditure before it is possible to generalize concerning the characteristics of the total number of cities.

Table No. 5

Medians, and deviations from medians, of percentile expenditures, for maintenance and operation, of all cities in the United States, having a population of 30,000 and over. Average for fiscal years 1900 and 1901

No. of city.	Police department.	Police department, courts, jails, workhouses.	Fire department.	Health department.	Municipal lighting.	Parks and gardens.	Schools.	Libraries and museums.	No. of city.
Median	8.20	8.85	8.27	1.03	5.52	1.05	24.31	1.02	Median
1	1.83	2.20	−3.64	− .01	−2.98	.48	− 7.25	− .38	1
2	9.73	10.36	−2.42	*	−1.86	2.31	10.02	− .10	2
3	6.89	10.80	−2.88	.36	.57	1.45	− 7.07	− .32	3
4	9.89	10.54	.14	.52	.68	.26	− 7.15	− .58	4
5	.14	5.40	−2.21	− .16	−1.85	1.16	−10.07	.40	5
6	3.72	5.30	−2.01	.08	− .77	1.97	− 7.30	− .73	6
7	.47	1.98	1.72	.27	− .26	.16	.63	.67	7
8	5.11	4.86	3.10	− .27	.35	2.27	− 4.85	.65	8
9	5.90	7.61	2.52	.37	−1.40	1.70	− 3.96	− .24	9
10	1.21	2.54	− .41	− .35	− .01	− .37	− 6.56	.24	10
11	.37	− .28	.82	.42	− .33	1.90	− 9.76	.66	11
12	2.71	−2.36	−2.05	.08	− .45	− .81	−13.55	− .81	12
13	6.48	6.13	5.89	.00	−2.53	1.74	−14.00	.51	13
14	1.05	1.13	3.50	.02	.40	.60	− 3.54	.67	14
15	4.07	9.12	−3.74	.24	−1.16	.22	− 3.94	− .87	15
16	*	1.58	−1.15	.55	− .49	− .94	− 4.26	− .18	16
17	*	2.39	−2.28	− .83	−1.30	− .82	−11.86	− .20	17
18	1.62	4.76	.07	− .74	− .38	.64	− 6.12	*	18
19	− .84	− .64	2.86	− .19	− .34	1.38	1.01	.41	19
20	2.06	1.10	1.58	− .44	2.68	.73	− 4.66	− .73	20
21	1.28	.78	2.13	− .21	1.14	3.00	8.64	1.18	21
22	2.40	2.89	2.19	1.52	−2.07	1.95	− .96	− .04	22
23	− .57	.33	− .06	− .63	1.23	1.32	− 2.84	− .39	23
24	−2.37	−2.56	−1.22	.02	2.26	− .12	− 7.77	− .91	24
25	− .17	− .17	.02	.41	− .11	2.63	12.26	.26	25
26	1.21	− .24	− .79	− .70	− .50	.97	1.31	− .30	26
27	.57	−1.22	− .45	− .18	− .88	.50	.41	.52	27
28	1.21	− .39	−1.25	.15	−1.65	− .45	− 1.28	− .44	28
29	−2.21	−2.86	−1.55	.19	− .65	− .50	− 2.76	.28	29
30	−1.41	−1.40	.17	.06	1.63	.58	− 4.47	.53	30
31	5.35	5.85	1.56	− .50	.20	.41	2.16	.02	31
32	1.80	1.44	.63	− .41	1.21	.99	1.03	.33	32
33	.39	− .26	− .68	.22	.56	− .89	− 5.16	− .04	33
34	1.49	1.97	1.57	− .10	−1.69	.02	− 1.28	.02	34
35	−2.33	−2.23	− .13	− .48	− .10	.31	2.05	.21	35
36	.77	.73	.54	− .13	− .96	3.10	8.92	.32	36
37	*	2.30	1.33	*	− .25	− .77	− 8.66	− .38	37
38	− .35	− .50	− .83	− .12	.72	− .44	20.69	.34	38
39	1.75	1.90	.20	.57	1.95	− .16	.17	.09	39
40	2.89	2.69	1.58	.00	.12	1.77	− 2.93	− .48	40
41	*	−3.02	−4.08	− .15	−2.21	− .08	− 3.42	− .18	41
42	−2.94	−3.15	− .37	− .58	− .78	.03	1.14	*	42
43	*	4.07	2.08	*	1.25	.73	− 9.90	− .47	43
44	− .13	.35	3.35	.40	−3.29	1.67	4.46	− .30	44
45	.40	1.29	.02	− .29	− .15	− .83	8.89	.05	45
46	.13	− .17	− .88	− .30	−2.89	.74	−14.09	− .65	46
47	*	2.42	2.23	.89	.15	*	− 3.66	− .56	47
48	−1.26	−1.32	.02	.09	−3.08	.09	− 3.08	.35	48
49	.57	.45	.25	− .18	−1.37	1.01	1.02	− .23	49
50	.25	− .40	−1.98	− .43	4.06	.85	5.14	− .45	50
51	4.10	3.98	−2.70	− .05	1.40	1.26	3.19	.03	51
52	4.01	7.29	1.98	− .43	4.25	− .87	2.49	− .84	52
53	2.90	2.66	1.19	− .21	−2.12	.67	.14	− .37	53
54	.33	.74	− .02	− .27	1.78	1.52	− 1.11	.65	54
55	−1.82	−2.97	− .72	− .12	−1.37	− .41	− 5.35	.45	55
56	2.67	3.14	2.88	.66	3.14	− .02	14.94	.96	56
57	− .52	−1.17	−1.26	3.35	−1.25	− .24	− 2.24	.45	57
58	2.87	2.22	− .80	1.84	− .50	1.03	− 2.74	.38	58
59	−1.80	−1.76	2.03	3.39	1.21	2.04	14.39	.31	59
60	−2.73	−3.38	− .11	− .48	− .22	.95	4.50	1.47	60
61	*	−3.00	−2.45	− .18	− .34	− .11	2.38	.40	61
62	3.11	2.86	−1.80	1.62	2.40	− .79	− 4.37	*	62
63	5.38	5.15	1.70	− .28	−2.23	− .48	− 1.05	.02	63
64	.69	.37	1.87	− .60	− .31	− .80	6.27	*	64
65	−1.32	−1.53	5.29	.64	3.65	− .19	− 5.01	− .18	65
66	−1.87	−2.16	2.90	.59	4.06	− .29	.85	− .02	66
67	1.14	2.78	1.22	− .03	.58	2.48	5.74	.63	67
68	5.54	4.57	− .15	.95	− .84	.25	−11.78	− .93	68

* No data given in Tables 1 and 2.

TABLE No. 5 (*Continued*)

Medians, and deviations from medians, of percentile expenditures, for maintenance and operation, of all cities in the United States, having a population of 30,000 and over. Average for fiscal years 1900 and 1901

No. of city.	Police department.	Police department, courts, jails, workhouses.	Fire department.	Health department.	Municipal lighting.	Parks and gardens.	Schools.	Libraries and museums.	No. of city.
69	*	*	*	*	*	*	*	*	69
70	−3.24	− .03	−2.95	− .34	−1.67	− .10	− 7.68	− .28	70
71	*	− .05	− .45	.97	*	1.23	− 3.70	*	71
72	−4.45	−3.68	.80	− .45	−3.16	.14	− 1.70	− .26	72
73	−1.17	−1.31	3.58	.37	2.81	− .22	7.35	.75	73
74	1.75	1.23	−3.58	*	−1.00	*	− .62	*	74
75	1.27	1.36	1.71	− .17	5.11	− .91	14.94	*	75
76	.53	.72	−1.26	1.46	.60	− .65	.14	− .68	76
77	−1.10	−1.75	−3.36	3.21	2.17	− .54	10.19	*	77
78	−2.39	−3.04	.49	− .59	− .84	− .15	− 5.66	− .27	78
79	1.35	1.73	−3.82	1.39	.40	1.50	− 6.11	− .53	79
80	− .84	−1.43	−2.48	1.85	−3.17	.20	−17.40	− .83	80
81	1.08	1.56	− .34	− .36	− .24	− .48	16.68	− .57	81
82	−1.97	−2.37	.94	− .32	−1.61	− .46	1.74	− .42	82
83	.32	− .34	6.35	.08	2.12	1.82	5.40	1.08	83
84	2.87	3.07	.40	.65	.73	− .80	11.01	− .47	84
85	*	− .50	1.37	*	−2.92	− .68	− 6.24	*	85
86	− .32	.54	− .88	1.64	−1.86	*	− 4.56	*	86
87	− .19	− .05	3.76	− .64	2.06	− .40	2.97	.54	87
88	− .02	.50	.92	.88	− .50	− .44	− 5.97	*	88
89	− .84	− .78	−1.29	− .68	− .43	− .91	10.24	− .60	89
90	−1.27	−1.92	−1.78	− .39	5.57	*	10.02	*	90
91	−4.10	−4.23	− .28	− .70	−1.17	−1.02	9.86	.12	91
92	−1.86	−2.53	.14	.30	− .95	*	− 3.11	.35	92
93	−1.02	−1.22	−2.12	.53	5.16	− .22	11.84	− .62	93
94	3.51	3.83	2.93	.55	− .52	*	− 6.56	*	94
95	−1.29	−1.93	−2.68	*	− .82	− .81	− 5.61	− .10	95
96	−1.68	−2.03	− .01	− .29	.61	*	8.84	*	96
97	− .56	.09	.83	.06	*	*	− .99	.15	97
98	*	*	*	*	*	*	*	*	98
99	3.55	6.35	1.09	.58	− .90	− .33	−11.31	*	99
100	*	6.07	5.83	.76	− .93	*	11.95	*	100
101	−1.42	−1.17	−1.69	− .37	3.26	1.28	3.71	.06	101
102	*	*	*	*	*	*	*	*	102
103	−4.29	−4.62	−2.74	− .60	*	− .24	− 7.11	− .47	103
104	*	−3.28	.24	− .43	.64	.22	− 3.02	.68	104
105	−1.63	−1.37	3.62	.12	−3.66	− .28	.51	− .54	105
106	− .26	− .17	2.11	.42	1.57	− .51	10.85	.90	106
107	− .42	−1.06	.49	− .57	1.17	− .72	3.05	*	107
108	− .44	1.54	2.08	.31	1.74	.83	4.11	.64	108
109	− .91	−1.57	2.53	− .77	1.00	.31	5.19	.27	109
110	−1.61	−2.25	−2.36	1.78	1.05	.02	− 3.72	.25	110
111	.03	− .35	−3.54	− .55	2.31	*	21.89	*	111
112	*	− .70	4.30	.56	3.17	.29	.79	− .64	112
113	*	−3.81	.43	− .27	2.73	*	14.01	*	113
114	− .63	−1.28	− .94	.65	− .71	.93	17.39	*	114
115	*	.57	1.63	.14	.28	*	6.33	*	115
116	.74	1.13	4.37	− .46	.81	*	4.54	− .87	116
117	−1.87	−2.52	−2.15	1.35	− .46	.80	− 2.13	− .21	117
118	1.53	.87	−2.57	.31	3.35	.34	11.44	*	118
119	1.81	1.16	−1.04	− .11	6.07	− .87	12.68	*	119
120	−3.10	−3.25	−2.56	.86	− .58	− .31	.69	.61	120
121	− .98	− .94	.24	1.73	−1.87	.75	9.43	.57	121
122	−1.96	−2.61	−2.89	.76	− .54	− .63	6.86	.43	122
123	−3.00	−3.25	−1.72	.08	−1.37	− .74	3.28	− .43	123
124	− .18	− .66	−5.85	− .60	1.06	*	1.26	− .17	124
125	*	.06	1.01	− .38	4.02	*	− 5.24	*	125
126	.76	.67	−1.31	2.74	2.40	− .88	− 1.77	*	126
127	−1.42	−2.07	−2.38	− .40	.66	− .48	− 2.28	.57	127
128	−2.84	−2.96	− .05	.75	−3.09	*	1.86	− .21	128
129	−2.67	−2.75	1.02	− .39	1.91	− .80	11.17	1.00	129
130	.25	− .24	−2.57	− .23	−3.75	− .79	− .05	.39	130
131	*	−1.57	1.39	− .47	1.35	− .34	8.22	− .47	131
132	3.48	4.35	1.72	1.73	−1.11	*	12.34	1.35	132
133	*	1.86	− .75	1.58	− .31	*	−15.47	*	133
134	*	−2.56	−1.70	− .80	3.75	*	1.64	− .38	134
135	*	2.60	3.96	− .55	.82	.51	− 7.88	− .87	135

* No data given in Tables 1 and 2.

Coefficient of Variability.—It is evident that the mere gross percentile figures do not permit us to say which one of the items under consideration tends to vary the most. Neither would a comparison of the limits within which 50 % of the cities lie give a valid standard. Thus it would be manifestly illogical to conclude, since the average percentile expenditures for schools vary from 6% to 46% (Table 4(*e*)), a spread of 41%, and since the average percentile expenditures for street lighting vary from 1% to 11% (Table 4(*d*)), a spread of 11%, that, therefore, the expenditures for schools are nearly four times (41:11) as variable as those for street lighting. In the same manner would the fallacy of measuring the relative variability of expenditures by ratio of the P. E.'s appear. By the reduction of all the variabilities to a common unit of measurement, it is possible to place the expenditures for each item on a comparable basis as far as the quality of the variation is concerned. Developed according to the probably best formula[1] these coefficients of variability are given in the fourth column of Table 6. It will be noticed that each item retains, in its tendency to vary, in each year, an almost identical position with reference to the other items.

TABLE NO. 6

Table of medians, average deviations, standard deviations, and coefficients of variability. Percentile expenditures for maintenance and operation. Fiscal years 1900 and 1901. All cities in United States above 30,000 population

	Median.		Average Deviation.		Standard Deviation.		Coefficient of Variability.	
	1900	1901	1900	1901	1900	1901	1900	1901
Police Department..	8.02	8.28	2.17	2.30	2.96	2.59	.767	.799
Police Department, Courts, Jails, etc..	8.82	8.88	2.49	2.37	3.37	3.20	.839	.795
Fire Department....	8.23	8.46	1.99	1.80	2.45	2.28	.693	.619
Health Department .	.93	1.07	.56	.79	.91	1.40	.583	.768
Schools.....	23.60	24.96	6.39	6.30	8.09	7.56	1.32	1.06
Libraries, etc.....	1.02	1.02	.48	.44	.58	.55	.483	.442
Parks.....	1.04	1.04	.84	.80	1.16	1.06	.82	.784
Street Lighting.....	5.51	5.56	1.69	1.65	2.15	2.10	.719	.696

Relationship of the Variabilities.—If the different sections of Table 5 were examined carefully, or even better, if the tables of

[1] $V=\frac{\text{A.D.}}{\text{Median}}$. See Thorndike, E. L., *Mental and Social Measurements*, pp. 98 to 102, especially p. 102.

the deviations of the percentile expenditures for schools from the median expenditure were compared, city by city, with the deviations from the median expenditure in another item, as, for instance, libraries and museums, it would frequently be found that a plus deviation in one item would be accompanied by a plus deviation in the other item and, *vice versa*, a minus deviation in one item would be accompanied by a minus deviation in the other. This quality of likeness would by no means *always* be found. But it *frequently* would. On the other hand, such a comparison with other items might reveal a degree of unlikeness; with still other items the relationships might seem to be in a state of neutrality or confusion.

At this point, some statistical manipulation which would permit these positive, negative, or neutral relationships to be expressed in some significant manner would be of inestimable service. If there is a positive relationship between the percentile expenditures for schools and the percentile expenditures for street lighting, or libraries, or parks, or any other of the items for which we have definite information, the knowledge of the fact would have practical as well as scientific value. Negative or neutral relationships would likewise be of interest and value.

Through the utilization of the Pearson Coefficient of Correlation it is possible to give a definite expression to these relationships. The application of and results derived from the use of the Pearson Coefficient will be developed and treated at length in Section VIII.

VII. Causes of Variability

There remains yet the open and legitimate question regarding the probable causes of the wide degree of variability exhibited by the percentile expenditures, for the various items enumerated. It is a veriest of commonplaces to repeat that cities, like individuals, would be expected to vary greatly in the amount and character of their expenditures. These variations have always been accepted as a concomitant fact of the differing needs and personalities of cities. In the following analysis an effort has been made to indicate and bring together some of those causes which may act as possible influences in the production

of variable expenditures—influences, too, which cannot be neglected in any consideration of public education in cities.

The variability of percentile expenditures, which has been observed, may be due to any one of eight general causes, or to combinations of these causes. These will now be taken up in the order of their supposed ascending influence upon the variability.

Influence of Population.—In accordance with the ordinary current notion regarding municipal affairs, there would seem to be some validity in the contention that the size of the city would be a predominating influence in the variability of such factors of municipal expenditure as are here treated. It might be held, with some show of reason, not only that the large city would necessarily have a larger relative expenditure for maintenance and operation than the small city, but also that the number of its needs would be greater; and as the number of its avenues of expenditure increased, the resulting tendency would be a diminution of the proportion of the public revenues available for each of the specified needs.

If the data upon which this work is constructed are fairly reliable, a distribution of the percentile expenditures for the various items, according to population classes, would disclose the degree of variability obtaining within these selected groups of cities. These distributions have been made for three items and are presented in Tables 7 (*a*), 7 (*b*) and 7 (*c*). From these tables, which are merely examples of all the distributions, it is very evident that no positive statement of the cause of variability, as depending upon population alone, can be made. The tendency toward a somewhat smaller range of variability, exhibited by the groups of larger cities in the tables, may be due to the smaller size of their groups, as compared with the groups of smaller cities, especially Group IV. *Very* large cities and *very* small cities may differ a great deal as to the quality and range of municipal and fiscal activity. In the main, however, the essential elements entering into the life of a city of 500,000 population differ but little from those of a city but one tenth as large. This particular point is an important one to keep in mind. Especially in educational administration is there a tendency to attempt to differentiate sharply between the conditions of the large and small city. In certain respects only is such a differentiation justifiable. The general conclusion appears to be, then, that

TABLE NO. 7

Tables of frequency. Percentile expenditures for maintenance and operation according to population groups.[1] *Fiscal years 1900 and 1901*

Per cent.	Group I		(a) Schools II		III		IV	
	1900	1901	1900	1901	1900	1901	1900	1901
6							1	1
7							1	0
8							0	0
9						1	0	0
10	1				1	0	1	1
11	1	1			0	0	0	0
12	0	0			1	1	0	1
13	1	2			0	0	1	0
14	1	0			1	1	0	0
15	2	1	1	1	0	0	1	0
16	1	0	1	1	0	0	1	1
17	3	2	2	2	1	0	4	2
18	1	3	1	0	4	0	1	3
19	1	4	1	0	0	2	1	3
20	1	1	0	2	3	5	3	2
21	2	2	2	2	4	2	3	4
22	0	0	1	1	3	2	2	2
23	2	0	0	2	1	4	4	1
24	0	0	0	0	5	1	1	2
25	1	1	3	2	2	0	2	3
26	0	1	2	1	1	3	1	1
27	0	0	0	1	1	1	2	5
28	0	0	1	0	2	4	3	4
29	0	0	0	0	0	3	1	2
30	0	0	0	0	1	2	2	2
31	1	0	0	0	2	1	1	1
32		0	1	1	2	0	1	1
33		0	1	1	1	2	1	2
34		0	0	0	0	0	5	4
35		0	0	1	0	1	4	2
36		1	0	0	0	1	2	2
37			1	0	1	0	1	1
38			0	0	0	1	1	1
39			0	0	1	0	2	1
40			0	0	1	1	0	0
41			0	1			0	0
42			0				0	1
43			0				0	1
44			0				0	1
45			0				1	0
46			0					1
47			0					
48			1					
No. of cities,	19	19	19	19	39	39	55	59
Median,	17.9	19.1	25.2	23.5	24.0	26.0	26.9	27.6

[1] The following basis for the selection of the groups of cities was used:
Group I.—All cities above 200,000 population.
Group II.—All cities from 100,000 to 200,000 population.
Group III.—All cities from 50,000 to 100,000 population.
Group IV.—All cities from 30,000 to 50,000 population.

TABLE No. 7 (*Continued*)

Tables of frequency. Percentile expenditures for maintenance and operation according to population groups. Fiscal year of 1901

(*b*) Fire Department.					(*c*) Police Department, Courts, Jails etc.				
Group	I	II	III	IV	Group	I	II	III	IV
Per cent.					Per cent.				
2				1	4				1
3				0	5			3	6
4	2		2	1	6	1	3	6	11
5	2		3	7	7	0	2	4	10
6	3	1	3	9	8	1	6	6	10
7	2	6	8	7	9	1	2	5	7
8	3	5	8	12	10	2	4	2	4
9	0	4	5	8	11	3	1	7	4
10	2	3	6	4	12	1	0	3	2
11	3		3	5	13	4	0	1	1
12	1		1	2	14	1	0	2	1
13	1		0	1	15	0	1	0	2
14			1	1	16	2		0	
15				1	17	1		0	
No. of	—	—	—	—	18	0		1	
cities,	19	19	40	59	19	1			
Median,	8.2	8.2	8.5	8.5	20	0			
					21	0			
					22	1			
					No. of	—	—	—	—
					cities,	19	19	40	59
					Median,	13.1	8.8	9.55	8.1

the size of the city apparently has but little influence upon the *variability* of the percentile expenditures for certain municipal activities.

Influence of Geographical Location.—At the best, the arbitrary segregation of cities into geographical groups for fiscal study must be unsatisfactory. The difficulties are much the same as with the division into population groups. *Some* eastern cities are markedly different from *some* central cities, and *some* central cities from *some* western cities. As groups of cities, eastern cities might not differ very much from central cities, nor central cities from western cities. The group of southern cities undoubtedly does reflect certain characteristics which have a tendency to place them in a class by themselves. This is notably the case as regards the support of education, where the situation is complicated by the traditional individualism and the difficult race problem. Table 8 gives the distribution of the percentile school expenditures according to arbitrarily made geographical

TABLE NO. 8

Tables of frequency. Percentile expenditures for schools according to geographic groups. All cities in the United States above 30,000 population. Fiscal year 1901 [1]

Per cent.	Group I	II	III	IV	V
6			1		
7			1		
8			0		
9			0		
10			2		1
11		1	0		0
12		0	1		0
13		1	1		0
14		1	1		0
15	1	1	2		0
16	1	0	0	1	0
17	3	2	4	1	0
18	3	2	1	0	1
19	0	1	1	1	0
20	3	1	1	0	2
21	6	3	0	2	0
22	0	3	1	1	1
23	2	2	0	3	0
24	2	5	0	0	0
25	2	3	0	2	1
26	2	0	0	2	0
27	1	0	0	1	1
28	0	1	0	5	0
29	0	0	0	1	0
30	0	1	0	1	1
31	0	0	0	4	0
32	0	1	0	2	1
33	0	2	0	1	0
34	0	2	1	1	1
35	0	0		3	1
36	0	2		0	0
37	0	1		0	2
38	0	0		0	1
39	1	1		1	
40		0		1	
41		0			
42		0			
43		0			
44		0			
45		1			
46		0			
47		0			
48		1			
Total,	27	39	18	34	14
Median,	21.3	24.3	16.7	28.6	29.1

[1] The following is the basis for the selection of the groups:

Group I.—Cities of Maine, New Hampshire, Vermont, Connecticut, Massachusetts, and Rhode Island.

Group II.—Cities of New York, New Jersey, Pennsylvania, Maryland, West Virginia, Delaware, and District of Columbia.

Group III.—Cities of all southern states, including Texas.

Group IV.—Cities of Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, and Missouri.

Group V.—Cities of all states west of Missouri River.

groups. As a whole the table is a demonstration of the predication of the small influence of geographical location upon the exhibited *variability* of expenditures. The only features worth noticing in passing are (a), the limited variability for the cities of the New England states, and (b), the generally low percentile expenditures in the southern cities. When it is recalled that these latter cities are credited with spending for education the money received from state and county, which in a number of cases is all that is spent, this low percentage is significant.

Influence of Municipal Environment.—The environment of a city as contrasted with its mere geographical location may be a factor of no mean influence in determining the quality and range of its expenditures. A thriving seaport, a mining community, or a large railroad centre, might require a much larger relative expenditure for police protection than a city developed as a residence district. Northern and southern cities might differ greatly in their respective expenditures for education merely on account of the item of fuel for school buildings. A city built in a congested manner would reasonably require a greater expenditure for fire protection than one of similar size, yet of much greater area. Proximity to natural sources of power (water and natural gas) might exert a decided influence in many items of municipal expenditure. The character of the natural drainage might easily serve as a deciding factor in the expenditure for health protection necessary in any city. These and many similar influences must be conceived as important factors in the discussion of causal relations of municipal fiscal policy.

Influence of the Mode of Classification of Public Accounts and of Systems of Accounting.—The modes of classification of public accounts and of the systems of accounting pursued by the fiscal authorities of different cities are most important factors in determining the possible character of the variability, within the group of cities, of the expenditures for any item. They are, in a sense, *secondary* factors in that they may not exert directly any important influence upon the *amount* of the expenditures of a city, although it is possible for them to do so. They are, however, the medium through which must be gained whatever exact knowledge we may have of the fiscal operations of the city. This is not the place to enter upon a technical discussion of the theory underlying a rational classification of municipal revenues

and expenditures,[1] or to lay stress upon the increased administrative efficiency arising from some uniform system of municipal accounting.[2] It will be sufficient to indicate in a concrete manner the possible influence of the lack of uniformity in classification and accounting upon the data with which this study is concerned.

The absence of any sharp distinction between "expenditures for construction and capital outlay" and "expenditures for maintenance and operation" might cause chance variations in the amounts charged for the maintenance and operation of particular departments. Between the itemized expenditures for maintenance and operation of a group of cities, in the absence of any uniform system, a certain amount of variability would very likely be caused. Expenditures made in any particular direction and charged to a particular department in one city might, in another city, be charged to an entirely different department. For example, some one ex-

[1] Clow, F. R., *A Comparative Study for the Administration of City Finances in the United States with Special Reference to the Budget, Publications of American Economic Association*, Ser. 3, vol. 2, No. 4 (1901), pp. 667–914; Gardner, Henry B., *Municipal Finance in the Twelfth Census, Publications of American Economic Association*, New Ser. (1899), vol. 2, pp. 418–465. Both of these studies contain interesting and valuable observations upon present fiscal practices of American cities.

Circular of the Division of Wealth, Debt, and Taxation of the United States. Instructions to Clerks and Special Agents for the Collection of Statistics of Municipal Finance. Bureau of the Census (July, 1904).

[2] The most influential movement in this particular has been inaugurated by the National Municipal League, through the appointment in 1901 of a "Committee on Uniform Municipal Accounting and Statistics." Reports of this committee, made by its chairman, Dr. Edward M. Hartwell, are to be found in the *Proceedings of the National Municipal League* and form a valuable contribution to this important element of municipal efficiency and economy. The following reports of the committee, and other papers bearing upon the topic, are especially pertinent:

Hartwell, Edward M., Chairman, *Report of the Committee on Uniform Municipal Accounting. Proceedings National Municipal League*, 1903 and 1904.

Powers, L. G., *Uniform Accounting in its Relation to Comparative Municipal Statistics. Proceedings of National Municipal League*, 1904, pp. 230–241.

Cleveland, F. A., *What Constitutes Reasonable Uniformity in Municipal Accounts and Reports. Proceedings National Municipal League*, 1904, pp. 203–215.

penditure which in city A would be designated as an expense for police service might, in city B, be charged to the department of public health, and in city C, to the street department. The use of service transfers [1] and the duplication of accounts further tend to shrink or expand the expenditures of the departments in different cities. This tendency to the intermingling of classification and of accounts would certainly, in the case of the definite comparison of two or any small number of cities, render the statistics derived from these classifications and accounts invalid for any exact conclusions. However, as this intermingling is purely a matter of chance, and as long as these "errors" of classification and accounting are not of a constant variety, they will, in the large group of cities under consideration, be rendered less potent in affecting the results. This does not, of course, mean that absolute or approximate uniformity of conducting fiscal operations is not a most desirable and necessary aim to be attained for the purpose of comparative statistics. *A chance error is not equal to no error at all; neither is it equivalent to a constant error.*

These elements, though, are not the only ones tending to complicate the nature of our data and to influence the variability of the itemized expenditures. In the original tables the expenditures for various municipal undertakings, such as water works, gas works, electric light works, docks and wharves, markets, cemeteries, etc., are included in the total expenditures for maintenance and operation.[2] Now in reality these enterprises generally are made self-supporting, or nearly so, by the revenues derived from the sale of the commodities produced or the privileges granted; hence, to include the expenditures for these departments as constituent portions of the expenditures for the maintenance and operation of the municipality is, in a sense, an unscientific procedure. Inasmuch as 80 % of the cities have been reported as having expenditures of this kind, and inasmuch as, in general, the amounts concerned are small, when reduced to per cents. of the gross total, their influence is minimized.

[1] Service transfers are transactions between two departments, offices, or accounts of a city in which one performs some service for another and receives pay or credit therefor.

[2] Excluded from the statistics for 1902 and 1903. See Sections X and XI, pp. 67 ff.

The item "interest on debt" is a confusing one. In most American cities, with the constant increase of the bonded debt, it is becoming of more importance each year. The amount of this element causes its definite localization in the system of classification of municipal expenditures to be of prime significance. Even of more import is its differentiation into amounts chargeable to the various municipal activities.

Economists and fiscal experts are not of one opinion regarding its exact position in the system of fiscal classification. However this may be, in this study the whole amount of interest paid on debt has been treated as properly belonging to the ordinary expenditures for maintenance and operation.

As to differentiation, the problem assumes a more difficult aspect. A bonded debt is generally incurred for a definite purpose—water, streets, schools, etc. The interest on this debt then very properly belongs as a charge against the department or purpose for which the debt was created.[1] Systems of municipal accounting have not as yet made provisions for such a logical division of payments; hence, ordinarily the interest payment is regarded as a separate item. For the most part, and in the majority of cities, bonded debt has been incurred through three principal branches of municipal activity—streets, water, and schools. In the present study, the only one of these entering into the conclusions is schools. To have included the interest on the school debt as a portion of the expenditures for the maintenance and operation of schools would have tended to increase the amount of these expenditures, and hence, also, *probably* to increase the size of the correlations developed between the expenditures for education and expenditures for other activities.

Without doubt, some of the variability exhibited by the expenditures for education in the different cities is due to the inclusion or exclusion of the amount of interest paid upon the

[1] It is pertinent to note here that the report of the Committee of the National Educational Association on Uniform Financial Reports (*Proceedings National Educational Association*, 1897, pp. 344–352) *excludes* the interest on debt as an item of current expenditure entering into the cost of education. The argument for this exclusion (p. 348) seems to be of a specious nature, economically considered. On the other hand, the schedules of the United States Commissioner of Education, prepared for the reporting of expenditures for public education in cities, *include* the item of interest on debt among current and incidental expenses.

bonded debt for schools. The inclusion would, unless a careful discrimination had been exercised in collecting the statistics, have taken place most likely in the case of those cities whose public school corporations possess administrative and financial autonomy. The influence of this inclusion is a chance one and may temporarily be disregarded.

Properly speaking, the entire gross amount of the expenditures for municipal maintenance and operation should also be differentiated into amounts chargeable to certain definite or special departments. If this were accomplished, there would be no "other" or "miscellaneous" expenditures, which too frequently merely acts as a reservoir for lassitude, incompetence, or carelessness in the conduct of financial operations.[1] At least, the item could be made to serve as a restriction to over-classification and not act in the way it does now, as a hindrance to the obtaining of a clear notion of the actual cost of maintaining important branches of the municipal governmental machinery.[2] What do we know, for example, concerning the cost of maintaining the various general administrative departments of cities, of the cost of the collection of taxes, etc.? In the present case there may be, in some instances concealed within the item of "other" expenditures, amounts properly belonging to definite departments. Any errors arising from such wrong inclusion are unavoidable; but as they are of a purely chance nature their influence upon the conclusions regarding the entire group will probably not be large.

Influence of State Subsidies for Education.—That the amount of money received by cities from other jurisdictions—state or county—for the support of specified activities may exercise some influence upon the variability of expenditures in different cities has, in the past, been accepted without question. The exact character of this influence, whether positive, negative, or neutral, has not been determined in any conclusive manner. As this subsidizing is most general in the case of education, the extent of this influence may be considered of some moment in

[1] See Table 9, in which are distributed the cities according to the percentile amount of undifferentiated expenditures.

[2] In the statistics for 1902 and 1903, subjected to study in Sections X. and XI., the item for "miscellaneous" and "other expenditures" has been practically eliminated.

this investigation. To what degree is this plan of granting subsidies conducive to a corresponding proportional increase in the expenditure of funds derived from purely local sources?

TABLE NO. 9

Tables of frequency. Unclassified percentile expenditures for maintenance and operation. All cities in the United States above 30,000 population. Fiscal years 1900 and 1901

Per cent.	1900		1901
1	1		1
2	2		0
3	1		0
4	1		1
5	0		0
6	1		6
7	8		6
8	5		10
9	5		12
10	15		18
11	13		11
12	8		10
13	5		9
14	5		5
15	8		4
16	5		11
17	7		9
18	6		5
19	7		1
20	8		0
21	1		1
22	2		5
23	2		3
24	3		3
25	0		0
26	0		2
27	0		0
28	0		0
29	1		0
30	5		0
31	1		0
32	1		1
33	2		0
34	0		0
35	3		1
one case at 48	1	one case at 43 one case at 44	2
	Total, 133		137

Unfortunately, no reliable data exists relative to the ratio of state and local support of education in cities.[1] Neither is such

[1] What might be comprehensive and reliable sources of such data, viz., the reports of the United States Commissioner of Education, are most untrustworthy in this respect.

information readily obtainable for any large number of cities. The whole question can best be solved by eliminating from the present consideration the possible positive or negative effect of the state subsidy. Consequently, all the expenditures for education within any city, irrespective of the sources of the revenues from which such expenditures are made, have been treated on the same plane. For in spite of other influences, which may be exercised by the state subsidy, from a purely fiscal standpoint, every city soon begins to regard the income from state or county in the same light as that derived from local sources. If the state subsidy be too large it may decrease the local feeling of financial responsibility to a point far below that necessary for the complete social efficiency of public education. If the state subsidy be inappreciable, or nothing at all, local responsibility may be stimulated to a very high degree. At least, such is the working principle of the current state subsidies. At any rate, from a statistical point of view, the raising of the question here points to an unsolved problem in educational administration. The present day practices founded on the principle of the equalization of educational opportunity between the communities within any state may in reality be unjust and operate in a direction contrary to that anticipated.[1]

Influence of Distribution of Functions.—The form in which the several governmental functions are distributed and controlled will act as an important influence upon the variability of expenditures. Properly to describe this form necessitates replies to three questions.

(a) How far does the state, or county, or other civic authority, assume direct responsibility for the support of specific functions? For example, courts, care of defective, delinquent, and criminal classes, public education, parks, water supply? In some states, the state or county bears all or part of the expense of the support of such activities in the cities; in others, the cities themselves must directly assume these expenditures.

(b) How far do the citizens of any community, in an indi-

[1] An investigation pointing to the truth of this statement has been conducted by Professor Ellwood P. Cubberley, of Leland Stanford Junior University. See *General taxation for education and the apportionment of school funds.* Teachers College, Columbia University, Contributions to Education, No. 2.

vidual capacity, pay for the performance of functions which would be assumed by the municipal government in another locality? For example, removal of garbage, sprinkling and lighting of streets, public education, public libraries and parks, police service, etc.?

(c) How far have the cities in question been granted the authority or assumed the responsibility for the performance of those functions with which we are concerned? This of course is the result of the process of subtracting from those activities, which *might* be considered as falling within the scope of municipal control, those whose support *is* assumed by the state or retained by the private individual.

In any *one* to *one* comparisons of the expenditures of cities, the differentiation of function as between the municipality and other civil jurisdictions on the one hand, and between the municipality and private assumption on the other, must receive due consideration in the derivation of any valid conclusions.

There is also a necessity in such a study as this to give weight to the influence of this distribution of function. Too much importance must not however be attached to this influence. What is being attempted here is some view of the character and relationships of *municipal* fiscal activity. In just how far such character and relationships reflect administrative and civic efficiency is a somewhat different problem.

Influence of Economic Wealth of Municipalities.[1]—The wealth of any city may rightfully be supposed to be the largest factor in determining the amount of money devoted to public purposes. Other things being equal, the rich city has a proportionately greater potential source of income for public purposes than the poorer city, and thereby is enabled to extend and multiply its activities in a manner best calculated to satisfy its local needs. It is able to do much with comparative ease, while the poor city must make many sacrifices to accomplish even less. As has been indicated in an earlier section, the influence of the wealth of the community has been partially eliminated owing to the reduction to a percentile basis of the factors of determination. We are

[1] See Harris, W. T., *Some of the Conditions which Cause Variation in the Rate of School Expenditures in Different Localities, Proc. Dept. of Superintendence, National Educational Association,* 1905, pp. 45–63, for some of the broader aspects of this particular topic.

measuring according to a relative rather than an absolute standard.

Nevertheless, this element of superior resources is one which should enter into any complete discussion of the extent of the development of the various municipal activities. In a later section an attempt has been made to trace some connection between educational expenditures and the taxable wealth of the community.

Influence of Methods of Revenue and Expenditure Administration.—The influence of the revenue and expenditure methods upon the variability of expenditures is a complex one. The modes of taxation, the limitation by the states of the rate of taxation for general or special purposes, the isolation of special forms of revenue for special purposes (excise tax for schools), the exercise of more than one local tax authority over the same territorial jurisdiction (as is frequently the case with local school revenues), are some of the causes on the side of revenue likely to produce a wide variation in the expenditures for any particular item. The control of expenditures, whether by some centralized body or by a series of more or less independent boards having fiscal authority over certain departments, presents another class of variability producing influences which are intimately bound up with the prevailing political and administrative systems.

Influence of Municipal Personality and Ideals.—The previously enumerated influences likely to produce, either acting singly or in combination, the observed variation in the percentage of municipal expenditures devoted to definite purposes are, with the possible exception of the secondarily acting influence of methods of accounting, those largely without the direct and immediate control of cities themselves. A city does not determine its location; its population and its wealth expand or shrink from forces rarely subject to definite direction; the authority of the state, through administrative control or limitation of fiscal activity, is exercised in an arbitrary manner. Is there not some sphere in which the city acts in a self-determining manner as regards the particular aspects of its activity here being discussed? Lacking somewhat perhaps in definiteness, it is put forth at this point as a predication, that the greatest influences upon the variability are the intangible personality and ideals of the city. In these two words may be concentrated the probable

effects of all of the other influences. It cannot be maintained that, *as* is the location, population, kind of state supervision, method of taxation, or manner of administrative direction, *so* is the city. Neither, perhaps, could the contention be upheld that, *as* a city spends its money, *so* is the city. It might be said with greater chance of ready acceptance, that, *as* are the citizens *so* is the city. However, the happiness, contentment, civic capacity, and ethical standards of a community are not capable of measurement, beyond that by the use of varying subjective standards. It may be possible, though, to obtain, through such an objective standard as the character of its expenditures, some index of the personality and ideals of its people.

A municipality is seldom economical in the expenditure of its revenues. It is far more often either parsimonious or extravagant. The recognition of the principle of expediency is much more frequent than that of real worth, or of final utility. The cost of public service is doubled because of the price often paid to mediocrity, or on account of the tribute levied under a system of political feudalism. And this price is paid by reason of civic inertia and impotence, or because the standards of good service are not known. The social income is spent according to standards that *were* or *are*, and not according to standards that *ought to be*. A city is not a machine, and any description of the forces that make for progress or otherwise must keep in mind that human beings make up, and human minds direct, municipal affairs and set up civic standards. The final aim of the study will be to gain some insight into the personality and ideals of the American municipality as these are revealed to us through some of the aspects and relationships of its fiscal activity. For it is here perhaps that the character of this personality and of these ideals is best exhibited.

Conclusion.—The phenomenon of variability is a constant one, if cities are subject to the law that governs all other social institutions. This variability may be due, as we have seen, to a large number of causes.[1] Before attempting to analyze the connection which may exist between the causes and the variabilities, some of the more important relationships of these variabilities will be pointed out.

[1] There may be other minor causes leading to this variability. I have stated what seem to me to be the ones most likely to be influential.

VIII. Relationships between Items of Expenditure

Implications of the Variability.—In the previous discussion [1] concerning variability, the question was raised as to the probable relationships which might exist between the various items of expenditure. Do the cities that spend a larger proportion than is ordinary of their total expenditures for the maintenance and operation of public schools also spend a larger proportion than is ordinary for libraries, for street lighting, for police service, for protection of health, etc.? Or does a proportional large expenditure for education mean that this is accomplished at a sacrifice of the support of such other activities? In other words, does proportionai generous support of education convey any information concerning the character of the municipality regarded as a whole? If the existence of certain relationships can be demonstrated, then in general, a new basis of municipal worth and efficiency might be established.

The Pearson Coefficient of Correlation.—It will be recalled that a brief mention was made in the preceding section [2] of the use of the Pearson Coefficient of Correlation as a method of measurement for determining the exact nature of these relationships. Divested of its mathematical terminology this coefficient is a measure of the general relation of a deviation of the amount of one item of expenditure in a city from the typical amount of that item (*i. e.*, median, mode, or average), to the deviation exhibited by the same city of the amount of some other item of expenditure. A mere comparison of the variabilities of two items of expenditure within a group of cities might enable one to infer the existence of a relationship, especially if the relationship were a strong one and the tables did not contain so many cases as to preclude ready inspection and comparison. No amount of such inspection and *one to one* comparison, as has been suggested, would enable one to give a definite value to the relationship.

The Pearson Coefficient [3] is the agency by which we attain

[1] Pp. 40–41. [2] P. 41.

[3] The following references to the Pearson Coefficient of Correlation are given: Pearson, Karl, *Grammar of Science*, chapter on Correlation; Thorndike, E. L., *Educational Psychology*, pp. 26 *ff.*; Thorndike, E. L., *Theory of Mental and Social Measurements*, pp. 121 *ff.*; Spearman, C., *The Proof and Measurement of Association between Two Things*, *American Journal of Psychology*, XV., 1904, pp. 72–101.

this expression of exactness. This *Coefficient of Correlation* is a figure so calculated from individual records as to give the degree of relationship between two items which will best account for all the separate cases in the group. In other words, it expresses the degree of relationship from which the actual cases might have arisen with least improbability. It has possible values from +100%, through zero, to −100%. That is to say, in the present situation, a coefficient of correlation of 100% between any two items of expenditure, such as *schools* and *street lighting*, would posit that the city which spent the largest proportion of its total expenditures for maintenance and operation of education, also spent the largest proportion for street lighting; and that, if the cities were ranked in order according to the proportion spent for education, and then in the order according to the proportion spent for street lighting, the two rankings would be identical; that the position of any city with reference to the others in one item of expenditure would be the same for the other item (both being reduced to terms of the variabilities of the percentile expenditures as units to allow comparison). On the contrary, a coefficient of − 100 per cent. between *schools* and *street lighting* would mean that the city which spent the largest proportion for education spent the lowest proportion for street lighting; that the *best* city in our percentile ranking in education would be the *lowest* in the percentile ranking for street lighting. A coefficient of + 62 % would mean that (comparison being rendered fair here, as always, by reduction to the variabilities as units) any given station for one item would, on the whole, imply 62 hundredths of that station for the other. A coefficient of − 62 % would, of course, mean that any position above the central tendency for one item would, on the whole, mean a position below the central tendency for the other item equal to 62 hundredths of the amount the first was above the central tendency.[1]

Existing Relationships.—Table 10 presents the coefficients of correlation between certain items as they have been found to exist by use of the Pearson formula. The three columns give the amount of the coefficients for the two different years, and those derived from the average of these two years.

[1] This explanation has been adapted largely from Thorndike's *Educational Psychology*, p. 26.

TABLE NO. 10

Table of Pearson coefficients of correlation. Percentile expenditures for maintenance and operation for the fiscal years 1900 and 1901. All cities in the United States above 30,000 population

	1900	1901	Average of 1900 and 1901
Schools with—			
Police Department	+.0256	−.149	−.069
Police Department, Courts, etc.	−.0459	−.15	−.0679
Fire Department	+.203	+.065	+.0969
Health	−.0243	−.205	−.0145
Libraries and Museums	+.279	+.315	+.293
Parks	+.031	+.065	+.0156
Street Lighting	+.354	+.336	+.344
Interest on Debt			−.482
Other Expenditures			−.288
Street Lighting Department with Police Department			+.0685
Fire Department with Police Department, Courts, etc.			+.139

These particular items of expenditure were selected from the other items because there is, in all probability, less likelihood of variation and inequalities arising with them from confusion of accounts. While this element is not an entirely negligible quantity and perhaps never will be as long as there are differences in men and cities, it is assumed that the data collected and presented in our original tables reflect the approximately true nature of these particular expenditures in American cities.

Significance of Relationships.—Remembering the possibility of a Pearson coefficient varying in value from plus 1.00 through zero to minus 1.00, the small size of the coefficients in Table 10 [1] may appear to be without significance. That is, a coefficient of −.067 for police department, courts, jails, etc., may be without any readily ascertained meaning. It must, however, be kept in mind that a large percentile expenditure in any one direction leaves a correspondingly *less* amount to be distributed among the other activities. Hence, the plus correlations between schools and the four items indicated in Table 10, viz., fire,

[1] Throughout this explanation and interpretation the coefficients referred to are always the average coefficients for the two years' expenditures. The average figure is self-evidently a more reliable one.

libraries and museums, parks and street lighting, are demonstrations of certain tendencies of a significant nature. They indicate that there are some activities which bear a definite fiscal relation to each other, and these relationships undoubtedly reflect certain more or less constant characteristics of municipal expenditures.

The large positive correlation between the support accorded to public education and that accorded to libraries is what might be inferred. A generous attitude toward each is largely the result of the existence of the same cultural forces operative in any community producing certain municipal ideals.

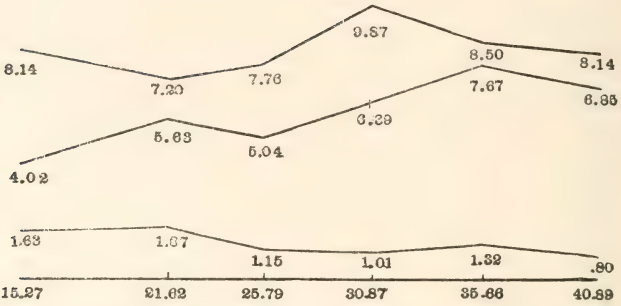
In a like manner, the positive coefficient of correlation between expenditures for schools and those for street lighting is indicative of similar forces at work. It is here recognized that the *cost* of street lighting may bear no direct proportional relation to the *amount* of lighting done, inasmuch as the cost is subject to a variety of influences, such as compactness of the community, wise or unwise contracts with private lighting companies, the proximity of the city to sources of natural power, etc. Having in mind these restrictions, it is still permissible to conclude that, in general, the city which is willing and able to give more than the ordinary (median) percentage of its total expenditures for public education, is also willing to give considerably more than the median amount to the lighting of its streets.

The large minus correlation between schools and interest on debt is significant and worthy of special attention by those who see danger in the marked tendency of American cities to increase their bonded obligations to the legal maximum.

The remaining correlations with schools, while small, are indicative of relations of an interesting nature. Apparently there is an inclination of cities to appropriate somewhat less than the normal proportion of their expenditures for police and health protection and slightly more than the normal for fire protection and parks as their educational expenditures rise above the normal percentile amount.

To be of the most value, the expenditures for each municipal department should be correlated with those for every other department. Especially should the relations between school expenditures and the expenditures for all other chief municipal departments be evaluated. The relation which the cost of

FIG. 11.



Explanation of Figure 11.—The diagram relates to the average percentile expenditures for 1900 and 1901, for the items indicated, in the 55 cities possessing a population of 30,000 to 50,000, according to the census of 1900. The numbers on the diagram were derived as follows: The 55 cities were arranged in the order of their *ascending* percentile expenditures for public schools. Thus arranged, they were then divided into six groups, each of the first five groups having ten cities, and the sixth group having five cities. The *averages* of the percentile expenditure for two years for each of the indicated items were then calculated, and the following results obtained.

Average Percentile Expenditures for

	Public Schools	Fire Department	Street Lighting	Health Department.
Group 1	15.27	8.14	4.02 (9)[1]	1.63 (7)[1]
" 2	21.62	7.20	5.63 (9)[1]	1.87
" 3	25.79	7.76	5.04	1.15
" 4	30.87	9.87	6.39	1.01
" 5	35.66	8.50	7.67	1.32
" 6	40.89	8.14	6.85	.80

Hence, if the expenditures for public schools be represented, according to scale, on a horizontal line, the general relation of the expenditures for each of the other items may be shown by a broken line, drawn to a scale, in accordance with the direction of the deviation of expenditures for the specified group of cities.

[1] Figures in parentheses indicate number of cities for which data were available.

general administration bears to that of educational administration and supervision; the relation of the cost of the various elements that enter into the maintenance of streets; these and many other salient and evident interdependencies must be determined before we shall be able to reach any absolute conclusions regarding the proportion of the social income which should be devoted to this or that essential purpose. Once determined, these relations may afford certain standards which would remove the more important items of expenditure at least from the realm of mere expediency. The complete set of these correlations would give a clear insight into the fiscal and perhaps the sociological characteristics of the American city. Until we have, however, better means by which to differentiate more sharply between the various items of expenditure, such work will be impossible; yet its accomplishment is a very necessary complement to that of establishing the very much needed standards for municipal and educational fiscal policies.

In Figure No. 11 (p. 60) an attempt has been made to give a diagrammatic representation of the character of the relationships expressed by the Pearson coefficients.

IX. Variability and Correlation of Per Capita Expenditures

It has been thought both advisable and necessary for any adequate treatment of the present phase of the fiscal position of education in cities to develop and point out relationships upon other than the basis of percentile expenditures.

Data.—For the following portion of the study the same general data were utilized as in the preceding sections. The tables of *per capita* expenditures [1] for the maintenance and operation of certain municipal departments as published in the Bulletins of the Department of Labor for 1901 and 1902 were selected as the chief basis.

Variability of Per Capita Expenditures.—An inspection of

[1] These tables were derived by dividing the expenditures for the various items by the figure representing the population: according to the official census of 1900, for the expenditures given for 1900, and according to the estimated population of January 1, 1902, for those of 1901. For a criticism of this last procedure, see *Proceedings of National Municipal League*, 1904, p. 253.

Tables 11 and 12 discloses the same wide variability in the per capita expenditures for the various items as was pointed out in the case of the percentile expenditures. The evidence afforded by this range of per capita variabilities is here adduced to lend force to the conclusions arrived at from the study of the variabilities of the percentile expenditures.

The wide range of the total per capita expenditures as displayed by Table 11(*e*) is an index of the extreme variability of municipal fiscal operations. That this variability is not produced alone by the commonly supposed increased cost of maintenance and operation as the cities increase in population and extent is confirmed by the evidence presented in Table 12.

TABLE NO. 11

Tables of frequency. Per capita expenditures for maintenance and operation. All cities in the United States above 30,000 population. Fiscal years 1900 and 1901

(*a*) Police Department, Police Courts, Jails, Workhouses, Reformatories, etc.			(*b*) Fire Department.		
Expenditure.	Frequency. 1900	Frequency. 1901	Expenditure.	Frequency. 1900	Frequency. 1901
$ .30	0	2	$ .20	1	1
.40	4	4	.30	3	3
.50	6	5	.40	5	4
.60	6	8	.50	4	5
.70	15	12	.60	8	11
.80	11	13	.70	11	11
.90	21	15	.80	16	13
1.00	8	20	.90	18	19
1.10	10	9	1.00	10	13
1.20	9	10	1.10	12	15
1.30	8	7	1.20	11	12
1.40	5	5	1.30	10	8
1.50	4	4	1.40	6	6
1.60	5	2	1.50	6	7
1.70	1	3	1.60	1	2
1.80	3	3	1.70	3	0
1.90	3	3	1.80	3	4
2.00	2	1	1.90	3	1
2.10	4	4	2.00	0	0
2.20	1	1	2.10	1	0
2.30	1	0	2.20		1
2.40	0	0			
2.50	0	0		Total, 132	136
2.60	1	0			
2.70	0	1			
2.80	0	0			
2.90	3	0			
3.00	0	0			
3.10	0	1			
3.20	0	2			
3.30	0	1			
3.40	0				
3.50	1				
	Total, 132	136			

TABLE NO. 11 (*Continued*)

Tables of frequency. Per capita expenditures for maintenance and operation. All cities in the United States above 30,000 population. Fiscal years 1900 and 1901

(c) Schools. Expenditure.	Frequency. 1900	Frequency. 1901	(d) Street Lighting. Expenditure.	Frequency. 1900	Frequency. 1901	(e) Total. Expenditure.	Frequency. 1900	Frequency. 1901
$ .80	1	0	$ .10	2	0	$ 4	1	1
1.00	1	5	.20	6	5	5	3	2
1.20	3	2	.30	3	4	6	4	4
1.40	3	5	.40	14	21	7	6	10
1.60	1	1	.50	17	15	8	9	15
1.80	5	4	.60	21	19	9	15	10
2.00	8	9	.70	20	26	10	13	22
2.20	6	9	.80	13	10	11	14	3
2.40	11	10	.90	13	12	12	10	12
2.60	17	8	1.00	6	8	13	7	13
2.80	9	16	1.10	4	2	14	8	10
3.00	9	9	1.20	2	0	15	9	8
3.20	9	14	1.30	1	1	16	8	10
3.40	14	14	1.40	0	1	17	5	5
3.60	15	4	1.50	1	1	18	6	3
3.80	2	5	1.60	0	1	19	3	0
4.00	6	6	1.70	2	0	20	2	0
4.20	2	2				21	3	4
4.40	3	3	Total,	125	126	22	1	1
4.60	2	4				23	1	
4.80	0	1				24	0	
5.00	1	0				25	0	
5.20	2	1				26	0	
5.40	0	4				27	0	
5.60	1					28	0	
5.80	0					29	0	
6.00	1					30	1	
						31	2	
Total,	132	136				32	0	
						33	0	
						34	0	
						35	1	
						Total,	132	136

The probable causes of the variability of the municipal expenditures, discussed at length in Section VII, will be recalled here. Whatever may be the extent of the influence of any, or all, of the causes, it cannot be assumed that the municipality spending $4 per year in the maintenance and operation of its various departments represents the degree of municipal efficiency of one devoting $36 for these purposes; nor that municipal economy is recognized equally in cities spending $5 and $25 per inhabitant in fulfilling their municipal functions.

TABLE NO. 12

Tables of frequency. Total per capita expenditures for maintenance and operation according to population groups.[1] *All cities in the United States above 30,000 population. Fiscal years 1900 and 1901*

Groups—	I		II		III		IV	
	Frequency.		Frequency.		Frequency.		Frequency.	
	1900	1901	1900	1901	1900	1901	1900	1901
$ 4	0	0	1	0	0	0	0	1
5	0	0	0	0	0	0	3	2
6	0	0	1	0	1	0	3	4
7	0	0	0	1	0	2	6	7
8	0	0	1	2	4	5	4	8
9	0	0	1	1	5	4	9	6
10	0	0	0	2	7	10	6	10
11	2	0	3	1	5	2	3	0
12	2	4	1	2	4	3	3	3
13	1	1	2	4	2	5	2	4
14	2	6	3	0	3	2	0	1
15	3	1	2	2	0	1	5	4
16	1	3	0	0	1	1	5	6
17	1	0	1	0	1	4	2	1
18	2	2	0	0	2	0	2	1
19	2	0	0	4	1	0	0	0
20	1	0	0		1	0	0	0
21	0	0	2		1	0	0	0
22	0	0	1		0	1	0	0
23	0	0			1		0	0
24	0	0					0	0
25	0	0					0	0
26	0	0					0	0
27	0	0					0	0
28	0	1					0	1
29	0	0					0	
30	0	0					1	
31	2	0					0	
32		0					0	
33		0					0	
34		0					0	
35		0					1	
36		1						
Total,	19	19	19	19	39	40	55	59

Figures 12–16 represent diagrammatically the data assembled in the tables of frequency.

Pearson Coefficients for Per Capita Relationships.—It is, however, from the Pearson coefficients of correlation that we obtain a further notion of the relationships that exist between certain of the elements of municipal expenditures. The details of the explanation of the meaning of Table 13 need not be given here, as they are similar to those given in the general

[1] See Table No. 8, p. 45, for grouping of cities.

FIG. 12.

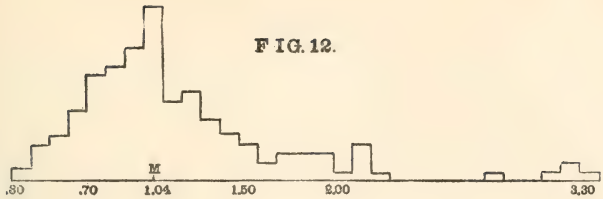


FIG. 13.

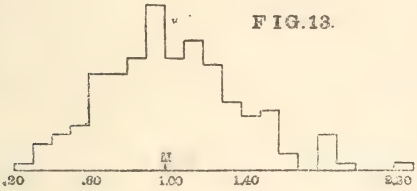


FIG. 14.

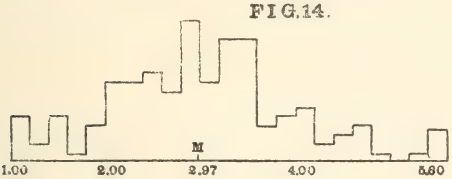
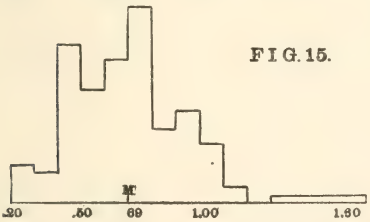


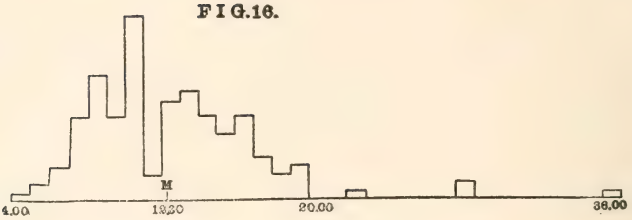
FIG. 15.



SURFACES OF FREQUENCY—PER CAPITA EXPENDITURES, 1901

Fig. 12.	Police Department, Courts, Jails, etc.	Median,	$1.04.
Fig. 13.	Fire Department.	Median,	1.00.
Fig. 14.	Schools.	Median,	2.97.
Fig. 15.	Street Lighting.	Median,	.69.

FIG.16.



SURFACES OF FREQUENCY—PER CAPITA EXPENDITURES, 1901

Fig. 16. Total for Municipal Maintenance and Operation. Median, $12.30.

explanation of the meaning of the Pearson coefficient and in the explanation of the percentile correlation. They signify on the whole that the cities spending above the median amount per capita on public education will spend only such an amount above the central tendency as is indicated by the degree of relationship expressed by the coefficient.

TABLE NO. 13

Table of Pearson coefficients of correlation. Per capita expenditures for maintenance and operation. All cities in the United States above 30,000 population. Fiscal years 1900 and 1901

Schools with—	1900	1901
Police Department, Courts, etc.	+.232	+.319
Fire Department	+.444	+.389
Street Lighting	+.333	+.361
Assessed Valuation of Real and Personal Property		+.45

The last correlation of those given in the preceding table, though somewhat uncertain in value, is indicative of one thing, namely, that while there is a decided tendency, on the part of those communities possessing a large amount of economic wealth subject to taxation, to spend a large per capita amount on education, these communities do not, in proportion to their increased wealth, spend a proportionately increased amount on education. Any accurate or valid conclusion regarding the influence of the amount of tax-producing property must include a consideration of the relation which the different sources of the

municipal income bear to one another. This would be especially necessary for all of those cities deriving any large amount of revenue from sources other than the general property tax. *Real* value of property as distinguished from *assessed* value would be a far better basis for a correlation figure which would give the relation between potential and actual support of the various municipal activities under a *régime* of general property taxation. The correlation is presented here not because it stands for any definite condition of things, but primarily to indicate the *possibility* of representing in a concrete manner the relation between the potential and the assumed responsibility of cities for the development and support of public education.

X. Supplementary Study of the Variability and Correlation of Municipal Expenditures [1]

Data of Municipal Expenditures for 1902 and 1903.—Under the title of *Payments for General and Municipal Service Expenses by Departments, Offices, and Objects*,[2] the Bureau of the Census has presented the data of the expenditures for maintenance and operation of the various municipal departments for the fiscal years 1902 and 1903, for the 163 cities of the United States possessing a population of 25,000 and over. For an extended exposition of the sources and character of this data reference is made to the introductory text, accompanying the statistics of cities. It is sufficient here to call attention to a few special features of the financial statistics which distinguish them from others of their kind, especially those presented in the reports of the Department of Labor, and which give to them a significant value for the present purpose. For the first time in the actual practice of gathering and presenting on a large scale municipal financial statistics, an effort has been made to differentiate the municipal activities and to adopt a terminology in harmony with the theory and principles of modern public finance. As far as this study is concerned the most important

[1] I desire at this time to make an acknowledgment of my deep obligation to Mr. L. G. Powers, Chief Statistician, Bureau of the Census, for his assistance in rendering accessible to me, before the distribution of the official report, the data upon which this portion of the study is founded.

[2] Table 21, *Bulletin* 20, Bureau of the Census (1905), pp. 204–20[illegible]

distinction made is that between *governmental* and *commercial* functions, a distinction long ago pointed out by writers upon public finance, yet one of somewhat tardy recognition by those engaged in gathering and presenting the financial statistics of cities.

The term *governmental functions* . . . includes those municipal functions which are as a rule performed for all citizens alike without any attempt to measure the amount of the benefit conferred or exact compensation therefor. Most of them are essential to the existence and development of government and to the performance of the governmental duty of protecting life and property and of maintaining a high standard of social efficiency. Chief among such activities are those of general administration; the protection of life, health, and property; the care of the defective, delinquent, and dependent classes; the education of the young, and the performance of other duties of a similar nature; the purchase of lands for municipal buildings, parks, and streets; the erection, equipment, and management of city halls and other buildings for general municipal uses; and the purchase or construction and operation of gas and electric light works for the exclusive purpose of lighting the streets and the city buildings, and of other structures and plants—such as printing offices, police and fire telephone systems, and bridges—for furnishing free of charge any commodity or service required by the city in the common interest of all its citizens. In the same category are included the opening, grading, paving, and curbing of streets, and the construction of sewers, where such public improvements are made at public expense, without, in the opinion of the proper authorities, conferring upon particular individuals measurable special benefits, for which compensation is exacted by the city. To the same general group belong the making and paying of loans and the payment of interest thereon, when such loans are made in connection with the other activities and transactions before mentioned.

. . . . . .

The *commercial functions* of cities include those which create trade relations, industrial or semi-industrial, between the municipality and the general public, including other municipalities or civil divisions. Among the transactions which arise from the exercise of such functions are those involving the loan of public money at interest, the use of public property for compensation, the sale of any commodity or article of commerce, or the performance of any work or service for pay. All these transactions involve the performance by the city of some service or the grant of some favor for special compensation, whether such service is undertaken or favor granted primarily

for the service to be rendered or favor bestowed, or for the revenue to be secured. None of them is essential to the existence and development of the government, although they may be made to contribute to its support.

Commercial functions, together with commercial and semi-commercial transactions which arise from them, may be grouped into three subclasses, here designated as *municipal investments*, *municipal industries*, and *municipal services*.

(1) Under *municipal investments* are included all transactions of municipal governments connected with the purchase, sale, or possession of real property or securities held exclusively for investment purposes, and the loan of public money to individuals, corporations, or other civil divisions. Such transactions are of two classes: First, those of the sinking, investment, and public-trust funds in which or through which the city invests money for the sole purpose of deriving interest, rent, or other income therefrom. Second, the transactions of a more temporary character by which the city receives interest on current cash deposits and on deferred payments of taxes and special assessments.

(2) *Municipal industries* are those activities—such as municipal waterworks, gas and electric light works, and street railways—which are organized as more or less complete departments or offices of cities for the purpose of furnishing economic utilities to individual citizens on such terms as may be determined by considerations of public policy. These activities are generally referred to by British writers as *municipal trading*. They are also frequently called *quasi-private industries* or *enterprises*. As economists use the term, a *quasi-private* industry or enterprise of a municipality is one in which the purpose of realizing a net income or profit controls the method of management and determines the charges, as in a private business of similar character. In this strict sense of the term there are few, if any, *quasi-private* industries or enterprises in the United States, the greater number of municipal industries established in American cities having been called into existence principally or solely to promote the welfare of the citizens. Hence the Bureau of the Census uses the term *municipal industries* to include not merely those properly designated as *quasi-private*, as defined above, but all departments, offices, or activities organized by cities to furnish utilities to their citizens for a compensation but without regard to the question of profit.

(3) *Municipal services* include all activities and transactions, other than such as are included in (1) and (2), which are engaged in by cities or by any of their independent branches or departments in the interest of the general public, but which confer measurable special benefits—or what are arbitrarily so regarded—upon particular persons, natural or corporate, for

which compensation is exacted. These services include the opening of streets, the construction of pavements, sidewalks, and sewers, the sprinkling of streets, and similar services, the payments for which are enforced by means of special assessments. To the same category belong also all services or special benefits rendered to private individuals or to other civil divisions *under legal regulations*, and paid for by fees, charges, rents, privilege rentals, and kindred remuneration.[1]

In the statistics presented by the bulletins of the Department of Labor these distinctions were not made, hence all expenditures on account of municipal investments, industries, and services have been included in the same class as those incurred in the pursuit of the more generally recognized governmental functions.[2]

The second important character of these statistics for 1902 and 1903 is the scheme of classification of the expenses, outlays, and revenues of cities.[3] The so-called general expenses are those in the exercise of governmental functions. In the tables the general expenses are divided into the following classes: (1) General Administration (including expenses for mayor and executive offices, legislative offices, law offices and accounts, finance offices and accounts, elections, public printing, etc.); (2) Public Safety (including expenses for courts, police department, militia and armories, fire department, department of inspection, health department, etc.); (3) Public Charities and Corrections (including care of poor—in and outside of institutions—children in institutions, lodging houses, miscellaneous charities, hospitals, prisons and reformatories); (4) Public Highways and Sanitation (including expenses of street paving, lighting, sprinkling and cleaning, refuse disposal, sewers, etc.); (5) Public Education (including schools

[1] *Bulletin* 20, Bureau of the Census (1905), pp. 4–7.

[2] For instance, the city of New York is charged with an expenditure for the maintenance and operation of the water-works system for the year 1901 the sum of $3,000,990; for construction and other capital outlay on account of the water-works system, $3,450,780; yet the receipts of the water department during 1901 were $8,050,900. It is manifestly inaccurate to place these expenditures on account of the water works system in the same category as those for public education.

[3] See Introductory Statement, *Bulletin* 20, Bureau of the Census, (1905), for definitions and explanation.

and libraries); (6) Public Recreation (including expenses for parks, gardens, baths, public celebrations and entertainments); (7) Other General Expenditures; (8) Interest on Municipal Obligations. While it is not the purpose here to contest the economic or statistical validity of the method of classification followed in the presentation of these statistics by the Census Bureau, and there are certain points open to criticism, the above description of their general nature has been inserted here primarily to direct attention to their increased usefulness for comparative purposes over those previously gathered by the Department of Labor, inasmuch as they reflect more accurately than any former statistics the fiscal activity of American cities.

Selection of Cities for Study.—In this portion of the study it was deemed more expedient to make a somewhat narrower selection of cities than that followed previously. To this end the group of cities having a population of from 25,000 to 50,000 was taken. This selection was broad enough to give a representative group, inasmuch as of the 163 cities of the United States having in 1902 a population of 25,000 and over, 78, or a trifle less than 50 % of them, fell within the group chosen for study. At the same time this selection produced perhaps a somewhat greater homogeneity of conditions affecting municipal expenditures than that of the group of cities previously studied.

Preliminary Arrangement of Data.—By reason of the system of distributive grouping of expenditures employed by the Census Bureau, it was thought advisable for the present purpose to combine under a fairly small number of representative and comparable headings the payments recorded for general and municipal service expenses. Without interfering with the mode of differentiation of these payments as presented in the tables, the total payments for general and municipal service expenses were divided into seventeen classes, as follows:

1. Expenses for General Administration. Including expenses for all executive and legislative offices, law offices and accounts, finance offices and accounts, statistical and miscellaneous general offices, city hall, and elections.

2. Expenses for Courts.

3. Expenses for Police Department. Including expenses

Showing percentages of total payments for general and municipal service years 1902 and 1903. Cities between

	Cities.	General Administration.	Courts.	Police Department.	Militia.	Fire Department.	Health Department.
1	Schenectady, N. Y.	11.54	.67	11.87		9.22	1.40
2	Youngstown, Ohio	8.21	.05	13.41		9.92	2.56
3	Holyoke, Mass.	10.32	.13	7.18	.001	10.66	2.25
4	Fort Wayne, Ind.	6.83	.28	9.34		15.77	2.11
5	Akron, Ohio	6.64	.13	8.05	.09	17.00	1.04
6	Saginaw, Mich.	9.24	.67	8.54		7.27	.57
7	Tacoma, Wash.	6.45	.25	6.51		8.73	.82
8	Covington, Ky.	11.28	1.17	10.25		9.10	1.72
9	Lancaster, Pa.	7.77		1.08		7.69	.72
10	Dallas, Tex.	7.66	.49	9.90		11.02	.18
11	Lincoln, Nebr.	8.08	.35	4.69		8.71	.82
12	Brockton, Mass.	9.37		7.44	.32	9.20	1.59
13	Pawtucket, R. I.	8.86	.07	8.10		6.81	.63
14	Birmingham, Ala.	7.52	.69	12.32	.07	13.45	1.97
15	Little Rock, Ark.	12.08	.90	16.78		15.05	1.96
16	Spokane, Wash.	7.96	.42	5.35		10.27	1.18
17	Altoona, Pa.	8.93		5.36		9.01	.83
18	Augusta, Ga.						
19	Binghamton, N. Y.	8.69	1.19	7.62		6.79	1.28
20	Mobile, Ala.						
21	South Bend, Ind.	7.94	.32	9.49		13.88	.29
22	Wheeling, W. Va.	8.17	.12	11.22		13.47	1.47
23	Springfield, Ohio	7.88	.65	7.57		8.99	2.22
24	Johnstown, Pa.	6.10		8.85		5.89	1.53
25	Haverhill, Mass.	6.29		6.98	.19	9.98	.97
26	Topeka, Kan.	7.52	.37	6.76		11.52	2.23
27	Terre Haute, Ind.	6.37	.27	8.84		19.43	3.33
28	Allentown, Pa.	7.09		6.00		9.61	2.10
29	McKeesport, Pa.	9.90		11.18		10.30	3.34
30	Dubuque, Iowa	8.43	.01	8.20		10.08	.61
31	Butte, Mont.	9.15	.51	13.73		12.48	1.26
32	Davenport, Iowa	6.60	.36	7.34		13.52	.87
33	Quincy, Ill.	5.93	.37	8.03		15.55	.36
34	Salem, Mass.	7.18		8.62	.79	7.57	3.61
35	Elmira, N. Y.	11.35	1.21	8.18		12.90	1.92
36	Malden, Mass.	5.09		5.68	.11	6.68	2.11
37	Bayonne, N. J.	9.46	1.49	13.13	.11	2.99	.90
38	Superior, Wis.	13.53	.41	6.88		18.37	2.98
39	York, Pa.	6.53		8.65		9.85	1.05
40	Newton, Mass.	7.67		7.73	.05	5.14	.87
41	East St. Louis, Ill.	8.82	1.13	8.72		9.98	.87
42	Springfield, Ill.	8.55		11.75		15.48	.85
43	Chester, Pa.	9.24		9.30		7.10	5.22
44	Chelsea, Mass.	5.78		7.92	.06	6.94	1.69
45	Fitchburg, Mass.	6.37		8.31	.07	8.26	1.48
46	Knoxville, Tenn.	8.10		8.07		12.38	4.33
47	Rockford, Ill.	5.32	.26	7.00		12.07	.67
48	Sioux City, Iowa	8.08	.33	6.80		7.38	.84
49	Montgomery, Ala.	6.05	.42	13.07		8.10	3.05
50	Taunton, Mass.	6.90	.19	8.71	.19	6.22	1.90
51	Newcastle, Pa.	8.09	.08	6.75		10.75	.77
52	Passaic, N. J.	8.96	1.35	6.11	.10	8.29	1.36
53	Atlantic City, N. J.	7.96	.82	11.58	.01	14.25	1.67
54	Canton, Ohio	5.88		8.25		11.19	1.44
55	Jacksonville, Fla.						
56	Galveston, Tex.	8.54	.26	9.78		12.15	1.52
57	Auburn, N. Y.	9.38	1.15	7.01		10.52	.92
58	Racine, Wis.	6.24	1.03	4.13		14.14	1.19
59	South Omaha, Neb.	12.16	.89	7.12		9.52	1.21
60	Joplin, Mo.	8.84	.60	9.89		13.85	.92
61	Joliet, Ill.	6.92		10.29		9.49	1.98
62	Chattanooga, Tenn.	7.83	.57	12.19		15.72	3.02
63	Woonsocket R. I.	6.76	.06	8.24		8.35	1.79
64	Sacramento, Cal.	8.50	.85	8.90		9.66	1.12
65	La Crosse, Wis.	10.45		6.91		13.39	.86
66	Oshkosh, Wis.	9.88	.50	5.52		15.67	1.69
67	Newport, Ky.	8.86	.26	8.53		5.26	2.56
68	Williamsport, Pa.	9.42		4.97		12.48	1.13
69	Pueblo, Col.	11.02	.20	8.00		6.83	2.29
70	Council Bluffs, Iowa	6.17	.77	5.96		16.73	.12
71	New Britain, Conn.	5.46	.82	6.23		10.28	3.51
72	Cedar Rapids, Iowa	6.45	1.10	6.68		8.97	2.27
73	Lexington, Ky.	15.66	1.01	12.03	.02	9.53	1.80
74	Bay City, Mich.	14.55	.72	8.92		10.68	.24
75	Fort Worth, Tex.	7.15	.30	7.62		8.78	.53
76	Easton, Pa.	7.40		6.35		9.12	.40
77	Gloucester, Mass.	11.37		7.88	.20	9.53	1.83
78	Jackson, Mich.	9.03	.95	8.16		13.32	.91

[1] For explanations concerning the derivation of this table, see p. 74.

expenses devoted to each of the itemized purposes. Average for the fiscal 25,000 and 50,000 population

Miscellaneous Public Safety.	Charities and Corrections.	Public Highways.	Municipal Lighting.	Public Sanitation.	Schools.	Libraries, Museums, etc.	Public Recreation.	General.	Corporate Interest.	Service Transfers.	
	4.21	4.83	7.85	10.65	21.70	.63	.24	.84	14.28	.03	1
.35	2.64	3.86	5.51	6.86	37.05	1.02	.47		8.13		2
	7.82	7.02	3.90	4.39	26.66	1.36	1.23		14.32	3.36	3
.33	.05	4.89	8.28	6.00	33.02	1.35	3.06		8.83		4
.06	3.30	7.79	8.08	1.48	37.05	1.73	.60		6.89		5
	3.23	14.37	3.93	3.62	36.05	1.07	.32		12.05		6
	.24	6.63		1.33	28.50	.98	2.01	1.92	35.70		7
	3.10	4.44	6.41	6.11	24.70	1.20	.03		20.37	.08	8
	.54	12.26	13.95	5.97	32.32		.13		8.64	.09	9
	3.85	12.18	5.50	3.63	22.80	.81	.74	.29	20.85		10
	.10	3.26	4.06	2.81	40.80	1.46	.02		24.77	.08	11
	8.69	9.98	4.53	5.28	25.06	1.66	.40	1.24	12.81	2.52	12
.28	2.94	9.25	5.61	4.27	23.75	1.33	.47		25.06	2.61	13
.08	1.94	10.96	3.60	4.14	13.72	.04	.63		28.57	.31	14
	3.88	9.03	2.27	1.71	30.30		1.21		3.48	1.18	15
	1.71	8.48	1.74	1.77	29.65	.48	1.60	3.60	25.83		16
.84		8.28	5.09	2.95	38.40				20.25	.02	17
No data for schools.											18
.30	13.35	9.30	9.12	2.79	31.90	.001	1.03		6.73		19
No data for schools.											20
.31		7.61	7.35	5.22	32.30	1.13	2.15	.48	11.65	.05	21
	1.68	4.88	7.84	6.12	33.67	1.71			9.15	.58	22
.05	2.81	4.00	12.43	7.98	31.90	1.38	1.96		10.23		23
.20	4.71	11.85	6.44	.001	47.05		.55		6.87		24
.05	13.62	10.40	6.61	2.31	25.76	2.24	1.71	.07	12.50	.27	25
	.56	9.86	3.72	1.60	41.76	1.22	.61		12.36		26
.16	.51	2.69	7.71	5.59	39.35	.73	.49		4.41		27
.45	.10	8.19	7.45	3.39	42.88		.08		12.60		28
.30	1.20	5.96	6.23	3.79	35.43	.94			11.22		29
		8.09	7.22	4.56	29.98	1.33	.45		21.02		30
.02	.84	8.71	4.08	3.55	36.35	2.79	.05		6.20	.34	31
.18		9.42	8.16	7.79	37.10	.95	3.22		4.51		32
	1.96	4.79	7.13	4.20	29.56	1.52	2.69		18.05		33
.45	17.65	5.86	7.68	3.66	25.22	2.33	2.33		6.97		34
.02	3.95	9.95	8.77	2.37	25.75	.51	1.72	.02	11.33		35
	6.26	9.33	4.71	3.63	27.80	2.29	.42	14.72	11.26	.61	36
	.87	6.43	7.34	2.14	32.77	.87	.40		21.07		37
	1.79	9.87	3.65	1.30	36.45	1.40			3.42		38
.06	.70	9.19	9.03	7.59	37.55	.12	.79		8.84		39
	3.74	10.74	5.12	4.55	21.58	1.55	.65	9.43	20.69	.57	40
		13.91	4.04	2.03	33.75	1.00	.05		15.65		41
.70	1.13	3.68	7.29	3.70	28.11	.93	3.34	1.57	12.85	.01	42
	4.45	3.75	8.16	3.44	34.92		.80		13.75		43
.33	9.98	7.02	5.30	4.37	24.03	.92	.65	13.98	9.60	1.31	44
	11.79	11.35	6.82	3.07	26.28	1.59	.82	.32	13.35	.02	45
	3.59	6.39	8.37	3.52	19.75				25.54		46
	.73	6.88	9.10	5.85	40.70	3.43	.26		7.68		47
	.02	8.36	4.10	6.62	30.01	.68	.61		26.12		48
	2.10	7.78	5.41	3.43	12.87	.30	.79		34.25	2.43	49
.35	9.52	11.23	3.09	2.36	25.75	1.66	.71	.30	17.85	3.13	50
	5.97	7.95	1.17	3.67	47.25		.04		7.60		51
.15	3.86	6.90	6.82	3.98	37.77	1.50	1.77	1.31	9.76		52
.22	4.46	5.20	6.74	13.30	16.76	.54	.33	1.13	15.16		53
.32	1.19	3.53	8.69	6.92	35.79	.90	1.33	.12	14.79		54
No data for schools.											55
	8.85	5.69	1.77	7.64	20.25	.31	.30		22.95		56
	7.96	8.42	9.27	4.54	29.50	.62	.04		7.49	3.22	57
	4.17	13.27	5.28	.21	39.20	3.03	.03		8.00		58
	1.67	4.62	6.06	.18	40.17	.08	.17		16.31		59
	.74	10.30		.18	44.50	1.71	.01	1.60	6.95		60
.80	.79	7.12	7.47	6.63	38.42	1.91	2.00		6.17		61
.18	7.52	3.90	6.70	5.19	17.90	.16	2.03	.17	16.85		62
	5.75	10.09	5.91	3.68	20.57	.24	.09	3.15	22.27	2.99	63
.21	.36	12.60	8.05	8.39	35.30	2.46	1.20		2.33		64
.06	.06	5.23	5.79	3.17	39.27	.55	.31	6.59	7.48		65
	3.74	12.93	5.62	1.56	33.57	2.26	.78	.06	6.35		66
.09	3.54	6.09	6.94	5.22	26.04	1.44	.05		35.42		67
	8.09	6.24	7.56	2.25	35.94		.88		10.80		68
	.46	11.50	4.04	1.61	33.27	.80	3.81	.15	12.52	3.44	69
.26	.14	5.07	4.72	2.27	42.82	1.50	2.30		11.12		70
		6.30	6.19	6.04	38.26		.94		15.90	.06	71
	.01	13.65	6.53	3.57	38.45	1.90	1.84	.45	8.16		72
	8.64	5.38	7.82	2.60	22.30	.49	.06		12.65	.01	73
	.29	9.46		4.80	33.61	1.05	.57		15.18		74
.16	1.01	10.36	1.03	.76	18.45	.89	.33		37.15	5.41	75
		10.36	.39	2.60	50.87	1.15	.07		11.25		76
.18	13.38	13.39	3.80	.91	22.50		.40		13.78		77
.03	6.10	12.85	6.52	4.79	27.60	1.49	.50		7.49	.80	78

for police, department of inspection (other than health), and pounds.

4. Expenses for Militia.

5. Expenses for Fire Department.

6. Expenses for Health Department.

7. Expenses for Miscellaneous Public Safety. Not included under 2, 3, 4, 5, and 6.

8. Expenses for Charities and Corrections. Including expenses for poor in, and out, of institutions, children in, and out, of institutions, miscellaneous charities; expenses for hospitals, insane, prisons and reformatories.

9. Expenses for Public Highways. Including general management and engineering expenses, expenses for street paving, sidewalks, bridges, snow removal and street sprinkling.

10. Expenses for Street Lighting.

11. Expenses for Public Sanitation. Including expenses for street cleaning, refuse disposal, sewers, and sewage disposal.

12. Expenses for Public Education.

13. Expenses for Libraries, Art Galleries, and Museums.

14. Expenses for Public Recreation. Including expenses for parks and gardens, baths and bathing beaches, celebrations and entertainments.

15. Miscellaneous General Expenses.

16. Expenses for Interest on Municipal Obligations. Including only net corporate payments, which equal gross interest payments made to public, less the included accrued interest receipts from public.

17. Expenses for Service Transfers.

Transformation of Gross Itemized Expenditures to a Percentile Basis.—As in the former case, the first operation was to transform the gross itemized expenditures to a percentile basis. This was accomplished, though not without much tedious arithmetical labor, for the group of 75 [1] cities for the fiscal year 1902 and the fiscal year 1903. The percentile expenditures thus obtained were then averaged for the two years, item for item. These average percentile amounts are contained in Table 14.

[1] Three cities necessarily omitted from the total number of cities—78—on account of the absence of data.

XI. Supplementary Study of the Variability and Correlation of Municipal Expenditures—(Cont.)

As with Tables 1 and 2, a cursory examination of the percentile amounts in Table 14 reveals a very wide range of expenses in the identical municipal departments of the different cities. This variability is perhaps all the more noteworthy when it is recalled that the percentile amounts are for cities within a very narrow population range, and is confirmatory of the previous argument concerning the relation between variability and population.[1]

Table No. 15

Tables of frequency. Average percentile payments for general and municipal service expenses. All cities between 25,000 and 50,000 population. Fiscal years 1902 and 1903

Frequency	General Administration.	Police Department	Fire Department.	Public Highways.	Frequency.	Street Lighting.	Public Sanitation.	Charities and Corrections.
					Below 1	1	6	20
1					1	4	8	10
2			1	1	2	1	12	4
3			0	6	3	7	17	11
4		3	0	7	4	8	10	5
5	6	5	4	6	5	11	7	2
6	16	12	5	9	6	13	8	2
7	14	12	5	7	7	13	4	3
8	17	21	9	7	8	8	1	4
9	10	6	15	11	9	4	0	2
10	2	3	8	7	10	0	1	0
11	5	5	3	4	11	0	0	1
12	2	3	6	5	12	1	0	0
13	1	4	7	4	13	1	1	3
14	1	0	2	1	14			0
15	1	0	6		15			0
16	0	1	1		16			0
17	0		1		17			1
18	0		1		18			
19	0		1		19			
Total,	75	75	75	75		72	75	68

Tables of Frequency.—The data of Table 15 present the tables of frequency for each of the items of expenditure enumerated in Table 14, excepting courts, militia, miscellaneous public safety, general and service transfers. Expenses under these headings were given for but few of the cities, hence rendering useless for comparative purposes the presentation of the forms of distribution. These tables of frequency are to be interpreted in the same manner as the similar tables in the preceding portion of the study.[2]

[1] See p. 42.

[2] See p. 31; also note 2 of p. 31.

TABLE No. 15 (*Continued*)

Tables of frequency. Average percentile payments for general and municipal service expenses. All cities between 25,000 and 50,000 population. Fiscal years 1902 and 1903

Frequency.	Schools.	Frequency.	Libraries, etc.	Frequency.	Public Recreation.	Frequency.	Health.	Frequency.	Interest on Debt.
		Below .1	3	.1	13				
12	1	.1	2	.1	2	.1	2	2	1
13	1	.2	1	.2	2	.2	2	3	2
14	0	.3	2	.3	5	.3	1	4	2
15	0	.4	2	.4	8	.4	1	5	0
16	1	.5	3	.5	3	.5	2	6	8
17	1	.6	3	.6	6	.6	3	7	5
18	1	.7	1	.7	5	.7	2	8	6
19	1	.8	4	.8	3	.8	9	9	3
20	2	.9	6	.9	1	.9	5	10	3
21	2	1.0	4	1.0	1	1.0	2	11	5
22	3	1.1	2	1.1	0	1.1	4	12	8
23	1	1.2	2	1.2	3	1.2	3	13	3
24	2	1.3	5	1.3	1	1.3	1	14	3
25	5	1.4	4	1.4	0	1.4	4	15	4
26	3	1.5	5	1.5	0	1.5	3	16	2
27	2	1.6	2	1.6	1	1.6	3	17	1
28	2	1.7	3	1.7	3	1.7	2	18	1
29	4	1.8	0	1.8	1	1.8	2	19	0
30	2	1.9	2	1.9	1	1.9	5	20	4
31	2	2.0	0	2.0	3	2.0	0	21	2
32	3	2.1	0	2.1	1	2.1	3	22	2
33	6	2.2	3	2.2	0	2.2	5	23	0
34	1	2.3	1	2.3	2	2.3	0	24	1
35	4	2.4	1	2.4	0	2.4	0	25	4
36	3	2.5	0	2.5	0	2.5	2	26	1
37	5	2.6	0	2.6	1	2.6	0	27	0
38	4	2.7	1	2.7	0	2.7	0	28	1
39	3	2.8	0	2.8	0	2.8	0	29	0
40	3	2.9	0	2.9	0	2.9	1	30	0
41	1	3.0	1	3.0	1	3.0	2	31	0
42	2	3.1	0	3.1	0	3.1	0	32	0
43	0	3.2	0	3.2	1	3.2	0	33	0
44	1	3.3	0	3.3	1	3.3	2	34	1
45	0	3.4	1	3.4	0	3.4	0	35	1
46	0			3.5	0	3.5	1	36	0
47	2			3.6	0	3.6	1	37	1
48	0			3.7	0				
49	0			3.8	1	4.3	1		
50	1					5.2	1		
Total,	75		64		70		75		75

Figures 17 to 28, pp. 77–80, represent diagrammatically the form of the distribution of the percentile expenses for each of the items indicated in Table 15.

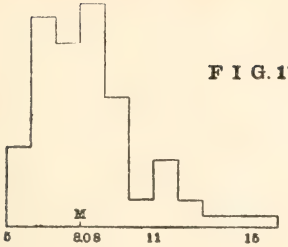


FIG. 17.

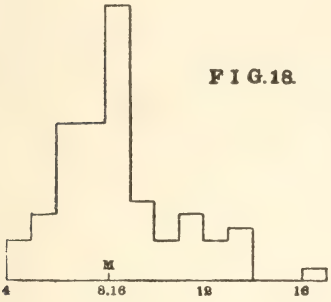


FIG. 18.

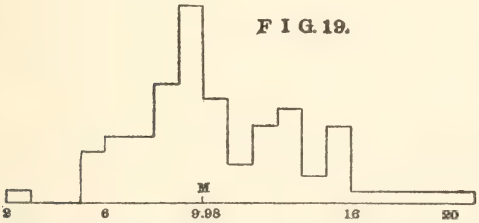
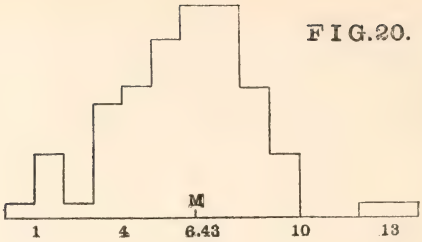
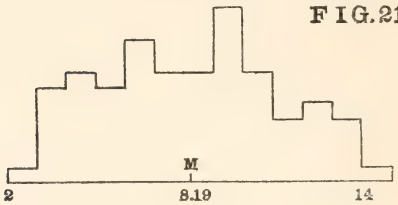


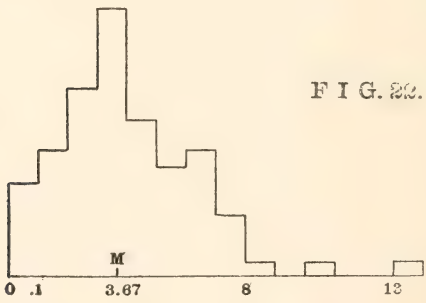
FIG. 19.

SURFACES OF FREQUENCY—PERCENTILE PAYMENTS FOR GENERAL AND MUNICIPAL SERVICE EXPENSES. AVERAGE FOR FISCAL YEARS 1902 AND 1903. SEVENTY-FIVE CITIES BETWEEN 25,000 AND 50,000 POPULATION.

Fig. 17.	General Administration.	Median, 8.08.
Fig. 18.	Police Department.	Median, 8.16.
Fig. 19.	Fire Department.	Median, 9.98.







SURFACES OF FREQUENCY—PERCENTILE PAYMENTS FOR GENERAL AND MUNICIPAL SERVICE EXPENSES. AVERAGE FOR FISCAL YEARS 1902 AND 1903. SEVENTY-FIVE CITIES BETWEEN 25,000 AND 50,000 POPULATION.

Fig. 20.	Street Lighting.	Median, 6.43.
Fig. 21.	Public Highways.	Median, 8.19.
Fig. 22.	Public Sanitation.	Median, 3.67.

FIG. 23.

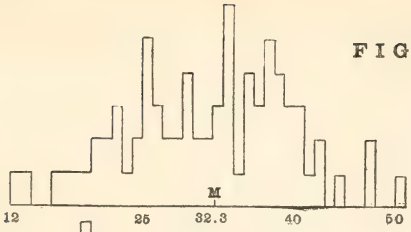


FIG. 24.

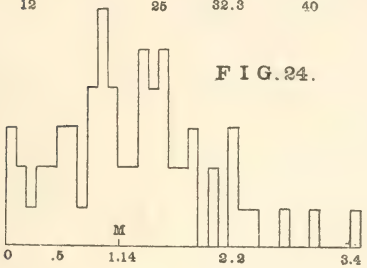
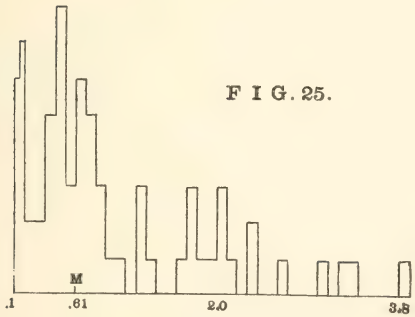


FIG. 25.



SURFACES OF FREQUENCY—PERCENTILE PAYMENTS FOR GENERAL AND MUNICIPAL SERVICE EXPENSES. AVERAGE FOR FISCAL YEARS 1902 AND 1903. SEVENTY-FIVE CITIES BETWEEN 25,000 AND 50,000 POPULATION.

Fig. 23.	Schools.	Median, 32.3.
Fig. 24.	Libraries, etc.	Median, 1.14.
Fig. 25.	Public Recreation.	Median, .61.

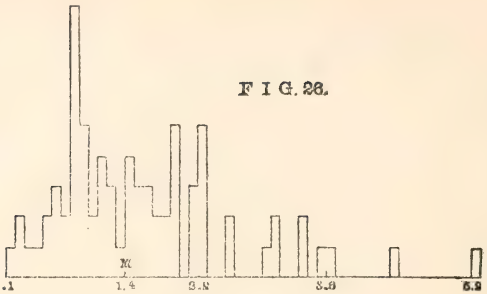


FIG. 26.

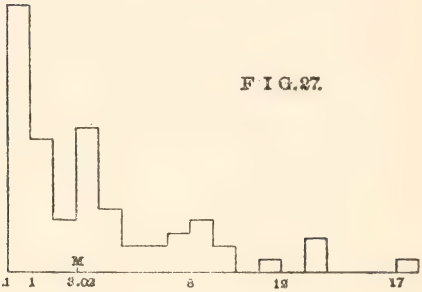


FIG. 27.

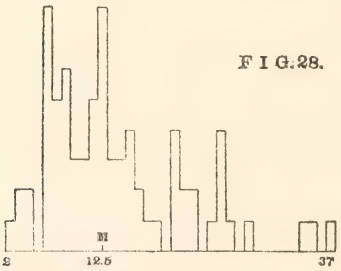


FIG. 28.

SURFACES OF FREQUENCY—PERCENTILE PAYMENTS FOR GENERAL AND MUNICIPAL SERVICE EXPENSES. AVERAGE FOR FISCAL YEARS 1902 AND 1903. SEVENTY-FIVE CITIES BETWEEN 25,000 AND 50,000 POPULATION.

Fig. 26. Health Department. Median, 1.4.
Fig. 27. Charities and Corrections. Median, 3.02.
Fig. 28. Interest on Debt. Median, 12.5.

Measurement of Variability; Probable Error.—Recalling the discussion in Section VI regarding the methods of determining the character of the variability exhibited by the different items, the following table will be self-explanatory:

TABLE No. 16

Table of measures of variability of percentile payments for general and municipal service expenses. Seventy-five cities between 25,000 and 50,000 population. Average of fiscal years 1902 and 1903

	Fifty percent of the cases lie between			2 P. E.
General Administration	6.76%	and	9.24%	2.48%
Police Department	6.98	"	9.49	2.51
Fire Department	8.71	"	12.99	4.28
Health Department	.87	"	1.98	1.11
Charities and Corrections	.79	"	5.75	4.99
Public Highways	6.00	"	10.30	4.30
Street Lighting	4.10	"	7.71	3.61
Public Sanitation	2.37	"	5.22	1.85
Schools	25.75	"	37.10	11.35
Libraries	.73	"	1.55	.77
Public Recreation	.29	"	1.20	.91
Interest on Debt	8.13	"	15.99	5.86

Remembering the differences in the data used in deriving the percentile basis of Table 16 and of Table 4A, and keeping in mind the difference in the grouping of the cities concerned, the two sets of P. E. are scarcely comparable. Each set of data, however, serves as an index of the wide degree of variability which exists in municipal expenses.

Measurement of Variability—Deviation from Central Tendency.—As in the case of the statistics for 1900 and 1901, the variability of each item of expense has been measured by means of the amount by which each member of the group of cities deviates from the median of the group. The individual deviations, plus and minus, are reproduced in Table 17. From these individual measures it is possible to determine the character of the group variability in each item of expense in several ways. First, the *average* amount by which each city varies from the central tendency—in this case the median—of any item would give the average deviation, or A. D. Second, a more accurate statement of the preceding, viz., the square root of the average of the squares of the deviations from the median of any item of expense would give the so-called standard deviation for the entire group of cities. The average and standard deviations are presented in Table 18 for each of the different items of expense.

Medians, and deviations from medians, of percentile payments for general and municipal service expenses of cities in the United States having a population of 25,000–50,000. Average for fiscal years 1902 and 1903

No. of city.	General Administration.	Police Department.	Fire Department.	Health Department.	Charities and Corrections.	Public Highways.	Street Lighting.	Public Sanitation.	Schools.	Libraries, Museums, and Art Galleries.	Public Recreation.	Interest on Debt.	No. of city.
Median	8.08	8.16	9.98	1.40	3.02	8.19	6.43	3.67	32.30	1.14	.61	12.50	Median
1	3.46	3.71 −	.76	.00	1.19	−3.36	1.34	6.98	−10.60 −	.51 −	.37	1.78	1
2	.13	5.25 −	.06	1.16 −	.38	−4.33 −	.92	3.19	4.75 −	.12 −	.14 −	4.37	2
3	2.24 −	.98	.68	.85	4.80	−1.17	−2.53 −	.72 −	5.64	.22	.62	1.82	3
4	−1.25	1.18	5.79	.71 −	2.97	−3.30	1.85	2.33 −	.72	.21	2.45 −	3.67	4
5	−1.44 −	.11	7.02 −	.36	.07 −	.40	−6.55 −	2.19	4.75	.59 −	.01 −	5.61	5
6	1.16	.38 −	2.71 −	.87	.21	6.18 −	2.50 −	.05	3.75 −	.07 −	.29 −	.45	6
7	−1.63 −	1.65 −	1.25 −	.58 −	2.78 −	1.56	*	− 2.34 −	3.80 −	.16	1.40	23.20	7
8	3.20	2.09 −	.88	.32	.08	−3.73 −	.02	2.44 −	7.60	.06 −	.58	7.87	8
9	− .31	1.92 −	2.29 −	.68 −	2.58	4.07	6.47	2.30	.02	* −	.48 −	3.86	9
10	− .42	1.74	1.04 −	1.22	.83	4.09 −	.93 −	.04 −	9.50 −	.33	.13	8.35	10
11	.00 −	3.47 −	1.28 −	.58 −	2.92	−4.93 −	2.37 −	.37	8.50	.32 −	.59	12.27	11
12	1.29 −	.72 −	.78	.19	5.67	1.79 −	1.90	1.61 −	7.24	.52 −	.21	.31	12
13	.78 −	.06 −	3.17 −	.77 −	.08	1.06 −	.82	.60 −	8.55	.19 −	.14	12.56	13
14	− .56	4.16	3.47	.57 −	1.08	2.77 −	2.83	.47 −	18.58 −	1.10	.02	16.07	14
15	4.00	8.62	5.07	.56	.86	.84 −	4.16 −	1.96 −	2.00	*	.60 −	9.02	15
16	− .12 −	2.81	.29 −	.22 −	1.31	.29 −	4.69 −	1.90 −	2.55 −	.66	.99	13.33	16
17	.85 −	2.80 −	.97 −	.57	*	.09 −	1.34 −	.72	6.10	*	*	7.75	17
18	*	*	*	*	*	*	*	*	*	*	*	*	18
19	.61 −	.54 −	3.19 −	.12	10.33	1.11	2.69 −	.88 −	.40 −	1.13	.42 −	1.77	19
20	*	*	*	*	*	*	*	*	*	*	*	*	20
21	− .14	1.31	3.90 −	1.11	*	− .58	.92	1.55	.00 −	.01	1.54 −	.85	21
22	.09	3.06	3.49	.07 −	1.34	−3.31	1.41	2.45	1.37	.57	* −	3.35	22
23	− .20 −	.59 −	.99	.82 −	.21	−4.19	6.00	4.31 −	.40	.24	1.35 −	2.27	23
24	−1.98	.69 −	4.09	.13	1.69	2.66	.01 −	3.66	14.75	*	.06 −	5.63	24
25	−1.79 −	1.18	.00 −	.43	10.60	2.21	.18 −	1.36 −	6.54	1.10	1.10	.00	25
26	− .56 −	1.40	1.54	.83 −	2.46	1.67 −	2.71 −	2.07	9.46	.08	.00 −	.14	26
27	−1.71	.68	9.45	1.93 −	2.51	−5.50	1.28	1.92	7.05 −	.41 −	.12 −	8.09	27
28	− .99 −	2.16 −	.37	.70 −	2.92	.00	1.02 −	.28	10.58	*	− .53	.10	28
29	1.82	3.02	.32	1.94 −	1.82	−2.23 −	.20	.12	3.13 −	.20	* −	1.28	29
30	.35	.04	.10 −	.79	*	− .10	.79	.89 −	2.32	.19 −	.16	8.52	30
31	1.07	5.59	2.50 −	.14 −	2.18	.62 −	2.35 −	.12	4.05	1.65 −	.56 −	6.30	31
32	−1.48 −	.82	3.54 −	.53	*	1.23	1.73	4.12	4.80 −	.19	2.61 −	7.99	32
33	−2.15 −	.13	5.57 −	1.04 −	1.06	−3.40	.70	.53 −	2.74	.38	2.08	5.55	33
34	− .88	.46 −	2.41	2.21	14.63	−2.33	1.25 −	.01 −	7.08	1.19	1.72 −	5.53	34
35	3.27	.02	2.92	.52	.93	1.76	2.34 −	1.30 −	6.55 −	.63	1.11 −	1.17	35
36	−2.99 −	2.22 −	4.30	.71	3.24	1.14 −	1.72 −	.04 −	4.50	1.15 −	.19 −	1.24	36
37	1.38	4.97 −	6.99 −	.50 −	2.15	−1.76	.91 −	1.53	.47 −	.27 −	.21	8.57	37
38	5.45 −	1.28	8.39	1.58 −	1.23	1.78 −	2.78 −	2.07	4.15 −	.26	* −	9.08	38
39	−1.55	.48 −	.79	.35 −	2.32	1.00	2.60	3.92	5.25 −	1.02	.18 −	3.46	39
40	− .41 −	.43 −	4.84 −	.53	.72	2.55 −	1.31	.88 −	10.72	.41	.04	8.19	40
41	.74	.56	.00 −	.53	*	5.72 −	2.39 −	1.64	1.45 −	.14 −	.56	3.15	41
42	.47	3.59	5.50 −	.55 −	1.89	−4.51	.86	.03 −	4.19 −	.21	2.72	.35	42
43	1.16	1.14 −	2.88	3.82	1.43	−4.44	1.73 −	.23	2.62	*	.19	1.25	43
44	−2.30 −	.24 −	3.04	.29	6.96	−1.17	−1.13	.70 −	8.27 −	.22	.04 −	2.90	44
45	−1.71	.15 −	1.72	.08	8.77	3.16	.39 −	.60 −	6.02	.45	.21	.85	45
46	.02 −	.09	2.40	2.93	.57	−1.80	1.94 −	.15 −	12.55	*	*	13.04	46
47	−2.76 −	1.16	2.09 −	.73 −	2.29	−1.31	2.67	2.18	8.40	2.29 −	.35 −	4.82	47
48	.00 −	1.36 −	2.60 −	.56 −	3.00	.17 −	2.37	2.95 −	2.29 −	.46	.00	13.62	48
49	−2.03	4.91 −	1.88	1.65 −	.92	− .41 −	1.02 −	.24	−19.43 −	.84	.18	21.75	49
50	−1.18	.55 −	3.76	.50	6.50	3.04 −	3.34 −	1.31 −	6.55	.52	.10	5.35	50
51	.01 −	1.41	7.77 −	.73	2.95 −	.24 −	5.26	.00	14.95	* −	.57 −	4.90	51
52	.88 −	2.05 −	1.26 −	.04	.84	−1.29	.39	.31	5.47	.36	1.16 −	2.74	52
53	− .12	3.42	4.27	.27	1.44	−2.99	.31	9.63	−18.02 −	.60 −	.28	2.66	53
54	−2.20	.09	1.21	.04 −	1.83	−4.66	2.26	3.25	3.49 −	.24	.72	2.29	54
55	*	*	*	*	*	*	*	*	*	*	*	*	55
56	.46	1.62	2.17	.12	5.83	−2.50 −	4.66	3.97	−12.05 −	.83 −	.31	10.45	56
57	1.30 −	1.15	.54 −	.48	4.94	.23	2.84	.87 −	2.80 −	.52 −	.57 −	5.01	57
58	−1.84 −	4.03	4.16 −	.21	1.15	5.08 −	1.15 −	3.46	6.90	1.89 −	.58 −	4.50	58
59	4.08 −	1.04 −	.46 −	.19 −	1.35	−3.57 −	.37 −	3.49	7.87 −	1.06 −	.44	3.81	59
60	.76	1.73	3.87 −	.48 −	2.28	2.11	*	− 3.49	12.20	.57 −	.60 −	5.55	60
61	−1.16	2.13 −	.49	.58 −	2.23	−1.07	1.04	2.96	6.12	.77	1.39 −	6.33	61
62	.25	4.03	5.74	1.62	4.50	−4.29	.37	1.52	−14.40 −	.98	1.42	4.35	62
63	−1.32	.08 −	1.63	.39	2.73	1.90 −	.52	.01 −	11.63 −	.90 −	.52	9.77	63
64	.42	.74 −	.32 −	.28 −	2.66	4.41	1.62	4.72	3.01	1.32	.59 −	10.17	64
65	2.37 −	1.25	3.41 −	.54 −	2.96	−2.94 −	.64 −	.50	6.97 −	.59 −	.30 −	5.02	65
66	1.80 −	2.64	5.69	.29	.72	4.74 −	.81 −	2.11	1.27	1.12	.17 −	6.15	66
67	.78	.37 −	4.72	1.16	.52	−2.10	.51	1.55 −	5.50	.30 −	.56	12.92	67
68	1.34 −	3.19	2.50 −	.27	5.07	−1.95	1.13 −	1.42	3.64	*	.27 −	1.70	68
69	2.94 −	.16 −	3.15	.89 −	2.56	3.31 −	2.39 −	2.06	.97 −	.34	2.20	.02	69
70	−1.91 −	2.20	6.75 −	1.28 −	2.88	−3.12 −	1.71 −	1.40	10.52	.36	1.69 −	1.38	70
71	−2.62 −	1.93	.30	2.11	*	−1.89 −	.24	2.37	5.96	*	.33	3.40	71
72	−1.63 −	1.48 −	1.01	.87 −	3.01	5.46	.10 −	.10	6.15	.70	1.23 −	4.34	72
73	7.58	3.87 −	.45	.40	5.62	−2.81	1.39 −	1.17	−10.00 −	.65 −	.55	.15	73
74	6.47	.76	.70 −	1.16 −	2.73	1.27	*	1.13	1.31 −	.09 −	.04	2.68	74
75	− .93	− .54 −	1.20 −	.87 −	2.01	2.17 −	5.40 −	2.91	−13.85 −	.25 −	.28	24.65	75
76	− .68 −	1.81 −	.86 −	1.00	*	2.17 −	5.04 −	1.17	18.57	.01 −	.54 −	1.25	76
77	3.29 −	.28 −	.45	.43	10.36	5.20 −	2.63 −	2.76 −	9.80	* −	.21	1.28	77
78	.95	.00	3.31 −	.49	3.08	4.66	.09	1.12 −	4.70	.35 −	.11 −	5.01	78

* No data given in Table 14.

Measurement of Variability—Coefficient of Variability.— Were the question asked, which one of the items of expense varied most, no satisfactory deduction could be made based upon the different measures of variability just discussed. Does the expense for general administrative purposes vary more than the expense for police service? that for schools more than that for libraries? that for health more than that for fire protection? It could not be concluded, for instance, though the expense for general administration varies in the group of cities under consideration from 5.09 % to 15.66 %—a difference of 10.57 %—and while the expense for police service varies from 4.13 % to 16.73 %—a difference of 12.65 %—that the degree of difference between the two variabilities is that represented by the difference between 12.65 % and 10.57 %, or by the ratio existing between these two quantities. Neither would the declaration be sound that the difference in variability in the expense for schools and that for libraries is the difference in their gross variability or the ratio that the quantity of one variability bears to the other.

TABLE NO. 18

Table of medians, average deviations, standard deviations, and coefficients of variability. Average percentile payments for general and municipal service expenses. Fiscal years 1902 and 1903. Cities between 25,000 and 50,000 population

	Median.	Standard Deviation.	Average Deviation.	Coefficient of Variability.
General Administration....	8.08	2.06	1.54	.54
Police Department.....	8.16	2.38	1.74	.609
Fire Department.....	9.98	3.31	2.58	.817
Health Department.....	1.40	.997	.747	.633
Charities and Corrections..	3.02	4.04	2.98	1.71
Public Highways.....	8.19	2.99	2.52	.908
Street Lighting.....	6.43	2.35	1.84	.725
Public Sanitation.....	3.67	2.43	1.78	.927
Schools.....	32.30	8.34	6.67	1.175
Libraries.....	1.14	.727	.56	.524
Public Recreation.....	.61	.92	.642	.814
Interest on Debt.....	12.50	7.79	5.75	1.62

Without entering upon the discussion of the *rationale* of the mathematical procedure involved, it may be said that the so-called coefficient of variability [1] does give an adequate and comparable figure which may serve as an index of the degree of

[1] See Thorndike, E. L., *Mental and Social Measurements*, pp. 98–102, especially p. 102.

variability to which the different items of expense are subject. Developed according to an empirical formula,[1] these coefficients of variability are given in the fourth column of Table 18. From these coefficients it is justifiable to say that the expense for libraries and that for general administration seems to be least subject to the influence of those conditions likely to produce variability, while the expense for charities and corrections, and interest on debt, and schools, possess, in the order named, the largest degree of variability.

Causes of Variability.—The probable causes of the variability of expense discussed at length in Section VII. seem to admit of application in the present instance. Especially significant appears to be the negative influence of population alone. Of the remaining possible causes previously posited, the only one demanding special mention here is that of the mode of classification of public accounts and of systems of accounting. It is believed that the efforts of the Bureau of the Census to present the data of municipal finance in a manner at once in accord with the standards of economists and of public and private finance, and admitting of some degree of comparison, have resulted more successfully than any other previous efforts in this direction. The care and thoroughness employed by the officials of the Census in the preparation of adequate schedules and in the collation of the data would seem to indicate that the confusion arising from the varying systems of accounting and from the differing modes of classifications of public accounts had been reduced to a point which gives the data special value for such *group* studies as this.

Relationship of Variabilities; Coefficient of Correlation.[2]—Developed in the same manner as in Section VIII, the following coefficients of correlation given in Table 19 have been arrived at upon the basis of the average payments for municipal expenses for 1902 and 1903.

There seems to be no need of analyzing the implication of these correlations. What was said in Section VIII regarding the meaning of these relationships finds additional proof in the

[1] $V = \frac{\text{A. D.}}{\sqrt{\text{Median}}}$

[2] See pp. 56 ff. for discussion of significance and mode of derivation of the coefficient of correlation.

character of the present coefficients. Each series presents in general the same distinguishing marks (compare Tables 10 and 19). Noteworthy is the identity of the positive correlation of the expense for schools with the expense for fire department, that for libraries and museums and that for street lighting.

TABLE NO. 19

Table of Pearson coefficients of correlation. Average percentile payments for general and municipal service expenses. Fiscal years 1902 and 1903, all cities between 25,000 and 50,000 population

Schools with—	
General Administration	−.094
Police Department	−.367
Fire Department	+.088
Health Department	−.187
Charities and Corrections	−.371
Public Highways	−.000428
Street Lighting	+.246
Public Sanitation	−.246
Libraries and Museums	+.30
Public Recreation	−.054
Interest on Debt	−.541

XII. RELATIONSHIPS OF THE DIFFERENT STANDARDS OF EXPENDITURES FOR EDUCATION

Classification of Cities on the Basis of Percentile School Expenditures.—The previous demonstrations regarding variability and relationships of municipal expenditures have provided us, it is thought, with a new instrumentality with which to gain an insight into the significant meanings of these expenditures. We are enabled to classify cities into groups according to their differing fiscal characteristics. Thus, it is possible to arrange all of the cities, whose expenditures have been considered, into groups according to whether they spend a large or small proportion of their total municipal expenditures for any particular item. Such groupings on the basis of percentile educational expenditures as have already been represented [1] give additional meanings to our coefficients of correlation and lend further significance to the phenomenon of variability.

Tables 20(*a*), 20(*b*), and 21 present certain other fiscal characteristics of *groups* of cities, the members of each group being selected, in tens, from the extremes of the variability range of percentile school expenditures. Without additional comment,

[1] See Fig. 11, and explanation, p. 60.

it may be noted that the totals (averages and medians) of the various items of expenditure tend to confirm the general relationships pointed out by the Pearson coefficients of correlation. Other groupings on this same basis could be made so as to include all of the cities. A confirmation of the general tendencies indicated by the coefficient figures might be looked for, although, as groups were formed of cities lying close to the central tendencies of the expenditures, the previously marked differences in the group characteristics would tend to disappear.

TABLE No. 20 (*a*)

Table showing general group relationships. Selection of cities based on percentile expenditures for schools, and made from all cities in United States having a population of 30,000 and over. Fiscal year 1901

Highest ten cities in percentile school expenditures:

No. of City.[1]	Schools.	Street Lighting.	All Street Expenditures except Lighting.	Interest on Debt.	Fire Department.	Police Department Courts, Jails, etc.
111	46.8	8.26	7.05	12.80	4.57	8.18
87	44.16	7.20	3.21	5.69	10.86	9.27
114	38.80	2.79	9.02	5.08	7.30	7.65
81	42.49	5.40	7.48	14.50	8.21	10.90
38	41.40	6.14	9.81	7.43	7.50	8.13
56	40.90	8.74	8.17	3.26	10.50	9.99
113	39.74	8.46	4.95	13.52	8.04	5.58
75	38.80	10.80	12.22	6.56	9.66	9.71
100	38.41	4.99	6.43	2.79	14.44	15.54
119	37.69	11.32	7.77	9.70	6.85	10.18
Median,	41.15	7.73	7.62	6.12	8.12	9.85
Average,	41.42	7.41	7.61	8.13	8.79	9.51

Lowest ten cities in percentile school expenditures:

37	15.40	5.40	14.43	17.60	10.00	11.10
43	14.32	6.48	8.74	12.31	10.11	12.15
17	13.90	4.48	6.76	27.61	6.70	11.71
5	13.07	3.60	11.65	15.49	5.87	13.17
99	12.30	4.18	7.36	28.91	9.28	14.34
68	12.76	4.49	6.64	25.66	7.94	14.78
12	11.12	5.03	3.69	18.60	6.20	6.24
133	10.26	5.54	8.80	30.85	7.84	11.45
46	9.83	2.71	8.02	29.78	7.34	8.60
80	6.96	1.96	11.80	29.45	5.52	7.29
Median,	12.53	4.49	7.06	28.26	7.59	11.58
Average,	11.99	4.39	8.49	23.63	7.68	11.08

[1] For names of cities see Table 2, pp. 22–25.

TABLE No. 20 (*b*)

Table showing general group relationships. Selection of cities based on percentile expenditures for schools, and made from all cities in United States having a population of 30,000 and over. Fiscal year 1901

Second highest ten cities in percentile school expenditures:

No. of City.[1]	Schools.	Street Lighting.	All Street Expenditures except Lighting.	Interest on Debt.	Fire Department.	Police Department Courts, Jails, etc.
118	36.90	8.92	6.01	12.80	6.22	9.90
2	36.85	3.62	4.82	6.80	7.40	17.66
59	36.70	6.65	5.27	6.88	10.90	7.43
129	36.06	7.21	10.83	8.33	9.94	6.25
25	35.93	4.86	9.07	7.09	8.22	9.08
90	35.66	11.02	8.33	9.90	6.13	6.43
93	35.30	10.20	7.64	4.30	5.98	6.94
77	35.20	7.54	9.03	12.80	4.47	6.83
84	34.93	5.88	8.25	7.93	8.49	11.45
132	34.70	4.47	11.03	6.66	7.59	13.24
Median,	35.79	6.93	8.29	7.50	7.50	8.25
Average,	35.82	7.04	8.03	8.35	7.53	9.52

Second lowest ten cities in percentile school expenditures:

85	18.24	3.17	9.02	22.32	9.28	7.79
10	18.12	5.48	6.19	27.94	7.59	11.07
94	17.91	4.58	2.67	18.99	10.11	12.07
30	17.87	4.83	7.88	12.88	7.66	6.59
135	17.85	2.41	9.59	18.30	13.26	12.31
34	17.73	2.10	7.69	8.02	6.79	7.79
4	17.51	6.72	7.72	8.93	8.82	13.17
3	17.37	6.46	5.45	7.48	5.76	22.36
24	16.98	7.72	5.92	16.14	7.43	6.60
98	16.48	6.59	12.27	13.35	8.60	15.26
Median,	17.79	5.15	7.71	14.74	8.13	11.57
Average,	17.61	5.01	7.44	15.43	8.53	11.50

[1] For names of cities see Table 2, pp. 22–25.

TABLE No. 21

Table showing general group relationships. Selection of cities based on percentile payments for schools, and made from cities in United States having a population of 30,000 to 50,000. Average for fiscal years 1902 and 1903

Highest ten cities in percentile school expenditures:

No. of City.[1]	Schools.	General Administration.	Police Department.	Fire Department.	Health Department.	Charities and Corrections.	Public Highways.	Street Lighting.	Public Sanitation.	Libraries, Museums, etc.	Public Recreation.	Interest on Debt.
76	50.87	7.40	6.35	9.12	.40		10.36	.39	2.60	1.15	.07	11.25
51	47.25	8.09	6.75	10.75	.77	5.97	7.95	1.17	3.67		.04	7.60
24	47.05	6.10	8.85	5.89	1.53	4.71	11.85	6.44	.01		.55	6.37
60	44.50	8.84	9.89	13.85	.92	.74	10.30		.18	1.71	.01	6.95
28	42.88	7.09	6.00	9.61	2.10	.10	8.19	7.45	3.39		.08	12.60
70	42.82	6.17	5.96	16.73	.12	.14	5.07	4.72	2.27	1.50	2.30	11.12
26	41.76	7.52	6.76	11.52	2.23	.56	9.86	3.72	1.60	1.22	.61	12.36
11	40.80	8.08	4.69	8.71	.82	.10	3.26	4.06	2.81	1.46	.02	24.77
47	40.70	5.32	7.00	12.07	.67	.73	6.88	9.10	5.85	3.43	.26	7.68
59	40.17	12.16	7.12	9.52	1.21	1.67	4.62	6.06	.18	.08	.17	16.31
Median,	42.85	7.46	6.76	10.18	.87	.73	8.07	4.72	2.44	1.46	.13	11.19
Average,	43.88	7.68	6.94	10.78	1.08	1.63	7 83	4.80	2.26	1.51	.41	11.75

Lowest ten cities in percentile school expenditures:

1	21.70	11.54	11.87	9.22	1.40	4.28	4.83	7.85	10.65	.63	.24	14.28
40	21.58	7.67	7.73	5.14	.87	3.74	10.74	5.12	4.55	1.55	.65	20.69
63	20.57	6.76	8.24	8.35	1.79	5.75	10.09	5.91	3.68	.24	.09	22.27
56	20.25	8.54	9.78	12.15	1.52	8.85	5.69	1.77	7.64	.31	.30	22.95
46	19.75	8.10	8.07	12.38	4.33	3.59	6.39	8.37	3.52			25.54
75	18.45	7.15	7.62	8.78	.53	1.01	10.36	1.03	.76	.89	.33	37.15
62	17.90	7.83	12.19	15.72	3.02	7.52	3.90	6.70	5.19	.16	2.03	16.85
53	16.76	7.96	11.58	14.25	1.67	4.46	5.20	6.74	13.30	.54	.33	15.16
14	13.72	7.52	12.32	13.45	1.97	1.94	10.96	3.60	4.14	.04	.63	28.57
49	12.87	6.05	13.07	8.10	3.05	2.10	7.78	5.41	3.43	.30	.79	34.25
Median,	19.10	7.75	10.68	10.69	1.73	4.01	7.09	5.66	4.35	.31	.33	22.61
Average,	18.36	7.91	10.25	10.75	2.02	4.32	7.59	5.25	5.69	.52	.60	23.77

[1] For names of cities see Table 14, pp. 72–73.

Classification of Cities on the Basis of Per Capita School Expenditure.—In like manner Table 22 illustrates the construction of groupings from the per capita expenditures which, even more than the percentile groupings, give objective evidence of the conditions predicated by the Pearson coefficients:

TABLE No. 22

Table showing general group relationships. Selection of cities based on per capita expenditures for schools, and made from all cities in United States having a population of 30,000 and over. Fiscal year 1901

Highest ten cities in per capita school expenditures:

No. of City.[1]	Schools.	Police Department, Courts, Jails, etc.	Fire Department.	Street Lighting.
132	$5.56	$2.12	$1.22	$ .72
60	5.53	1.04	1.50	1.03
1	5.51	3.21	1.32	.76
122	5.43	1.94	1.55	1.59
5	5.31	3.13	2.24	1.34
25	4.85	1.23	1.11	.66
41	4.67	1.37	.97	.77
61	4.64	1.04	1.02	.92
49	4.62	1.56	1.42	.72
120	4.62	.98	.99	.87
Median,	$5.08	$1.46	$1.27	$ .82
Average,	5.42	1.76	1.41	.84

Lowest ten cities in per capita school expenditures:

125	$1.49	$ .65	$ .66	$ .71
135	1.47	1.02	1.10	.20
126	1.46	.56	.53	.62
46	1.35	1.18	1.01	.37
37	1.31	.95	.93	.46
99	1.24	1.45	.93	.42
68	1.19	1.38	.74	.42
98	1.18	1.02	.62	.47
133	1.12	1.26	.86	.61
80	1.07	1.12	.84	.30
Median,	$1.27	$1.07	$ .85	$ .44
Average,	1.29	1.08	.85	.44

Fiscal Standards for Education.—After all, it may be asked, what is the real significance of these relationships and groupings? Unless they are indicative of certain positive or negative qualities of municipal activity, why develop them? In the general

[1] For names of cities see Table 2, pp. 22–25.

attempt to make a reply to this, we are led to discern if possible the relationships which may exist between the different expenditure standards in current usage. In this the effort will be confined to the different standards of educational expenditures, inasmuch as these are the factors which are of most concern in the present instance.

Classification of Cities on Basis of Cost per Pupil.—The ordinarily accepted standard for effort in the support of public education is the amount expended according to the number of pupils educated; in general, the annual cost per pupil educated, based on average daily attendance. This seems to be, of course, the sound basis. If expenditures are in any way related to efficiency and excellence and opportunity, then the actual amount of money devoted to each pupil attending school is the most essential fiscal fact. A city does not educate in its public schools all of the population, hence a rating on the basis of expenditure *per capita of population* would not be entirely sound, except in so far as the number of children in cities bore a constant relation to the total population. Even the number of children in a community is scarcely an index of the number of pupils in the public schools. Many within the age limit do not attend school for one reason or another. Private and parochial schools tend to reduce the number of pupils actually in the public schools.

Valuation of Different Standards.—In spite of this apparent proof of the validity of the *cost per pupil* basis, it is here thought that each of the several classifications, *percentile*, *per capita* and *per pupil*, has a special value in estimating potential municipal effort and actual educational opportunity afforded in any city. The difficulty has been in actual administrative practice, not in the lack of recognition of these different standards, but in the assignment of an adequate value to each.

Relationship of Different Standards.—Before suggesting any method by which this possible value may be attached to each of these standards, it is necessary to determine in some way just what relations these different standards bear to one another. Are they totally independent, or does the knowledge of one give any information concerning the others? To present the problem in a more definite manner, Table 23 has been constructed. The first three columns of the table (omitting the column giving

the index numbers of the cities) give the rankings of the 135 cities above 30,000 population, for the fiscal year 1900 according to the three standards which have been indicated.

The rankings of the first column were obtained by arranging the cities according to their percentile expenditures for education, giving to the city that spent the highest percentage, of its total expenditures, for education rank 1, to the city that spent the second highest percentage rank 2, etc. In a similar manner, the cities in column two were ranked according to their per capita expenditures. The figures for column three were obtained in an arbitrary yet uniform manner, from the data published in the report of the United States Commissioner of Education for 1899–1900,[1] by dividing the combined expenditures for teaching and supervision, and current and incidental expenses, by the average daily attendance. As this data is gathered by the Commissioner of Education directly from the school superintendents, it is, without doubt, fairly reliable.

From a casual inspection of these columns one might easily infer the existence of a positive correlation between columns two and three. That such a mutual relationship is present is indicated by Figure 29. It is of such a direct and conclusive nature that no attempt was made to measure its exact amount by the Pearson coefficient.

The relations between columns one and three and one and two are of a neutral or slightly negative character. This is demonstrated graphically in Figures 30 and 31, which represent the relations as they exist between the cities of from 30,000 to 50,000 population.

Value of Percentile Standard.—In view of these negative or neutral relationships between the rankings according to the percentile standard and those according to the other two, what estimate may be put upon this standard? It serves indeed, as we have already seen, as a means of determining with considerable accuracy the exact fiscal position of public education in its relation to other municipal activities. These relationships enable us to state specifically certain characteristics of fiscal

[1] Vol. II, Table 7, pp. 1798–1809, *Statistics of Population and School Enrollment and Attendance in Cities over 8,000 Population*, 1899–1900; Table 10, pp. 1832–1841, *Statistics of Expenditures of Public Schools of Cities over 8,000 Inhabitants in 1899–1900.*

TABLE No. 23

Rank of cities in the United States above 30,000 population in accordance with expenditures for education

No. of City.[1]	Percentile Rank. Expenditures of 1900.	Per Capita Rank. Expenditures of 1900.	Cost per Pupil. Rank, 1899–1900	Weighted Values.	Weighted Rank.	Weighted Rank, Excluding Southern Cities.	Total Expenditures, Maintenance and Operation. Per Capita Rank.
1	122	6	4	282	15	111	3
2	30	25	20	235	10	29	73
3	113	87	83	902	103	104	36
4	115	90	80	900	101	106	37
5	119	4	7	285	16	109	2
6	120	104	66	882	97	110	40
7	66	70	52	602	61	65	66
8	96	56	64	680	72	92	26
9	88	24	6	278	14	86	21
10	110	57	87	826	93	101	17
11	125	88	24	634	63	112	12
12	130	125	50	885	99		47
13	64	71	51	596	60	63	69
14	86	93	90	901	102	84	65
15	79	19	25	340	22	77	20
16	102	33	28	443	32	98	13
17	127	105	108	1109	119	113	10
18	105	96	104	1018	114		51
19	53	32	72	562	56	52	49
20	106	20	10	322	20	100	8
21	23	54	33	373	28	22	96
22	49	64	32	450	34	48	71
23	97	82	89	885	100	93	46
24	117	34	38	526	48	108	6
25	9	7	11	94	2	9	63
26	50	68	101	809	90	49	75
27	111	89	70	839	94	102	41
28	74	58	40	522	46	73	50
29	82	9	22	301	19	80	7
30	78	22	61	527	49	76	25
31	48	39	53	478	39	47	57
32	56	72	88	768	84	55	79
33	104	75	75	808	89	99	39
34	40	129	98	957	109	39	132
35	54	26	29	331	21	53	48
36	25	11	30	233	9	24	56
37	118	127	114	1187	122		111
38	1	55	41	372	27	1	126
39	58	48	19	355	24	57	52
40	75	52	56	586	58	74	44
41	84	5	18	273	13	82	5
42	71	84	34	564	57	70	68
43	123	122	128	1252	126		72
44	41	61	82	675	70	40	78
45	26	46	36	370	26	25	85

[1] For names of cities, see Table 1, pp. 18 ff.

TABLE NO. 23 (*Continued*)

Rank of cities in the United States above 30,000 population in accordance with expenditures for education

No. of City.[1]	Percentile Rank. Expenditures of 1900.	Per Capita Rank. Expenditures of 1900.	Cost per Pupil. Rank. 1899–1900	Weighted Values.	Weighted Rank.	Weighted Rank, Excluding Southern Cities.	Total Expenditures, Maintenance and Operation. Per Capita Rank.
46	129	123	125	1252	127		45
47	90	114	122	1232	125		49
48	98	78	16	510	43	94	43
49	62	17	1	180	4	61	27
50	42	101	118	977	112	41	112
51	51	108	99	921	105	50	113
52	59	103	107	962	111	58	100
53	87	115	109	1064	115	85	103
54	69	99	102	927	106	68	86
55	101	35	44	527	55	97	14
56	8	10	13	111	3	8	70
57	85	81	71	768	85	83	85
58	93	36	43	509	42	90	22
59	3	12	65	367	25	3	88
60	47	3	23	218	8	46	11
61	52	8	49	373	29	51	18
62	100	100	45	725	78	96	59
63	63	63	39	510	44	62	60
64	29	66	58	546	54	28	106
65	99	113	35	712	76	95	76
66	61	67	60	623	62	60	64
67	32	47	54	475	38	31	82
68	126	128	132	1296	132		81
69			No data				
70	34	13	55	382	31	33	54
71	76	111	119	1080	118		101
72	83	18	14	290	17	81	15
73	28	86	42	524	47	27	115
74	91	110	112	1072	117	88	90
75	4	85	96	743	80	4	124
76	43	79	124	446	107	42	92
77	22	76	85	697	74	21	116
78	112	31	31	472	37	103	9
79	67	16	5	207	7	66	23
80	132	131	120	1257	128		29
81	6	27	21	198	6	6	108
82	44	14	12	190	5	43	42
83	38	102	97	867	96	37	114
84	15	73	91	699	75	15	119
85	107	106	116	1112	120		62
86	95	109	47	752	81		83
87	35	60	59	545	53	34	89
88	108	119	123	1188	123		84
89	16	40	105	687	73	16	95
90	24	121	79	806	88	23	130

[1] For names of cities, see Table 1, pp. 18 ff.

TABLE NO. 23 (*Continued*)

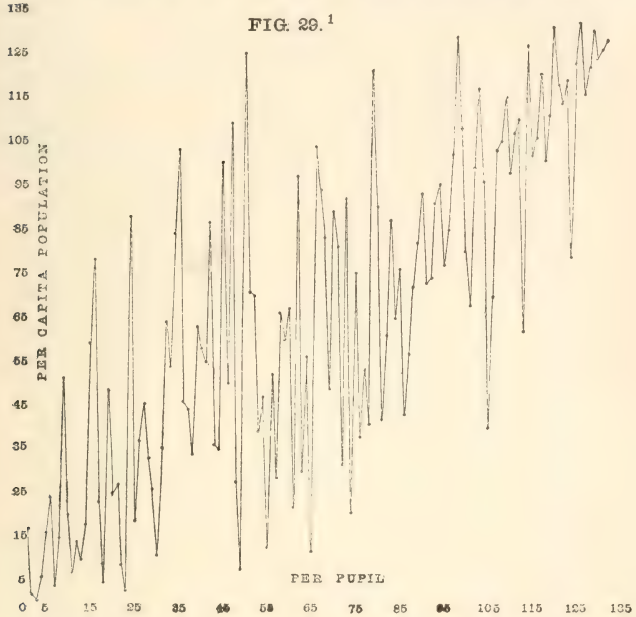
Rank of cities in the United States above 30,000 population in accordance with expenditures for education

No. of City.[1]	Percentile Rank. Expenditures of 1900.	Per Capita Rank. Expenditures of 1900.	Cost per Pupil. Rank, 1899–1900.	Weighted Values.	Weighted Rank.	Weighted Rank. Excluding Southern Cities.	Total Expenditures, Maintenance and Operation. Per Capita Rank.
91	18	65	84	651	67	18	110
92	92	49	69	676	71	89	28
93	10	41	78	533	51	10	104
94	109	116	127	1201	124		77
95	114	59	15	480	41	105	19
96	21	107	111	917	104	20	127
97	57	92	73	755	82	56	87
98			No data				
99	124	130	129	1283	130		107
100	20	112	115	951	108		128
101	39	80	100	818	91	38	99
102			No data				
103	128	50	46	636	65	114	4
104	81	44	37	479	40	79	32
105	89	51	9	376	30	87	35
106	13	28	48	350	23	13	91
107	37	74	92	758	83	36	98
108	46	117	103	958	110	45	123
109	27	97	62	655	69	26	121
110	94	45	27	458	36	91	24
111	2	91	93	741	79	2	129
112	73	69	106	883	98	72	61
113	11	98	110	866	95	11	125
114	5	21	74	443	33	5	102
115	33	95	94	821	92	32	117
116	36	77	95	778	86	35	105
117	55	42	81	641	66	54	53
118	19	94	67	655	68	19	122
119	12	118	121	983	113	12	131
120	77	15	8	239	11	75	16
121	14	43	86	587	59	14	97
122	116	2	2	254	12	107	1
123	45	53	77	634	64	44	67
124	72	23	17	298	18	71	30
125	103	126	131	1143	121		118
126	60	120	117	1065	116	59	120
127	80	37	26	451	35	78	31
128	70	29	57	512	45	69	34
129	17	62	113	785	87	17	109
130	68	30	63	541	52	67	38
131	31	38	76	556	55	30	80
132	7	1	3	32	1	7	33
133	131	132	126	1288	131		55
134	65	83	68	719	77	64	74
135	121	124	130	1264	129		93

[1] For names of cities, see Table 1, pp. 18 ff.

practices in cities. Alone, the percentile standard of expenditure tells us to just what extent it is *necessary* for the municipality to supported ucation, or to what extent the municipality is *willing* to support education, or to what extent it is *able* to

FIG. 29.[1]



support education. Necessity, willingness, and ability may represent different things entirely. The percentile expenditure may be comparatively low, yet the per capita and cost per pupil expenditures high (compare city 122 in the tables). In this case the possible number of pupils may be comparatively low and the general resources of the community comparatively high. In either case, it would be necessary to make use of the per capita or cost per pupil rankings and standards.

Value of Per Capita Standard.—The closeness with which this standard approximates that of the cost per pupil in any

[1] See p. 91 for explanation.

city might be indicative, in general, of the extent to which the facilities for public education were utilized by all of the children of the community. Any great divergence would indicate some cause which led to an unbalancing of the normal proportion of children and adults in the population, or it might indicate a non-attendance of pupils upon the public schools.

Value of Cost per Pupil Standard.—Without entering upon any detailed discussion as to the validity of the method by

TABLE No. 24

Table of frequencies. Expenditure per pupil for schools. Derived from data contained in report of the United States Commissioner of Education, 1899–1900

Cost per pupil.	All cities above 30,000 population.	All cities between 30,000 and 50,000 population.
$11	1	0
12	0	0
13	1	1
14	2	2
15	4	2
16	3	1
17	3	2
18	1	0
19	3	3
20	6	3
21	8	3
22	12	7
23	7	2
24	16	10
25	5	2
26	12	2
27	5	3
28	7	1
29	9	0
30	5	2
31	5	1
32	6	3
33	2	0
34	3	2
35	0	0
36	1	0
37	1	1
38	2	1
39	1	1
40	0	
41	0	
42	1	
	Total, 132	55

which this factor should be derived, and assuming that, in general, a high cost per pupil is indicative of a high standard of opportunity for education, it may be asserted that, in ranking cities in accordance with their fiscal policy toward educa-

FIG 30[1]

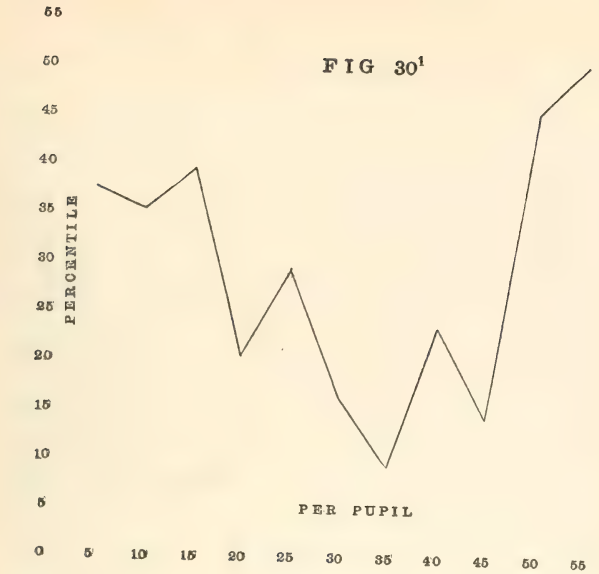
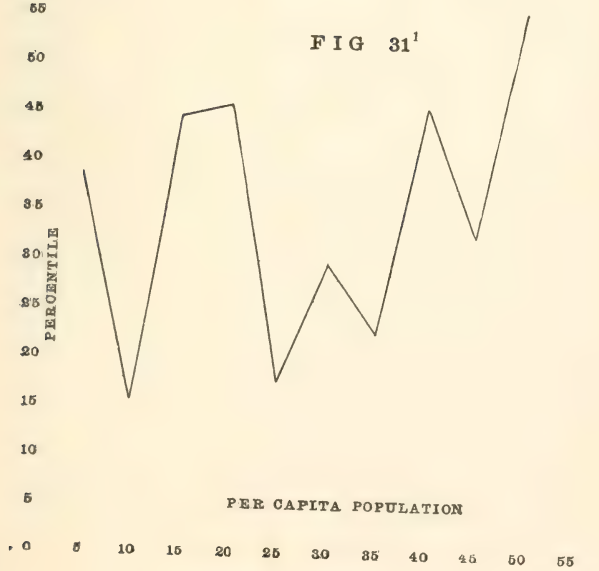


FIG 31[1]



[1] See page 91 for explanation.

tion, the greater weight should be given to this factor. In the present rankings a small number of discrepancies may have arisen by ranking some cities too high, owing to such causes, as, for instance, an extraordinarily high expenditure for secondary education, which would tend to raise the cost per pupil rank above that obtaining in reality by the average expenditure for all pupils.

Rankings According to Weighted Values.—Columns four and five of Table 23 are suggested as a possible method by means of which communities could be given a financial rank for their educational expenditures, by assigning certain values to the three previously discussed standards. Column four was developed by assigning a value of *two* to the rankings of column one, a value of *three* to those of column two, and a value of *five* to those of column three. The cities were then ranked in accordance with these weighted values, to the lowest value being given the first rank. The plan here followed is one that might be adapted on a more extended scale, including, for instance, such items as the percentage of the total amount expended for education devoted to the salaries of teachers, the proportional amounts devoted to elementary and secondary education, and so forth. By reason of the generally low position of the southern cities, a ranking according to the weighted values is given in column six of Table 23, excluding the southern cities.

In the last column of this table all of the cities are ranked in accordance with their total municipal expenditures on the per capita basis. The relation between the per capita expenditures for education and the per capita total expenditures, as determined by the Pearson formula, gave a result of + .56. This coefficient is to be interpreted as meaning that, as the general municipal expenditures increase, the expenditures for education do not increase at the same rate. In this respect this coefficient seems to indicate a similar tendency to that derived from the relation between the amount of school expenditures and the assessed valuation of property in cities.[1]

XIII. General Conclusions

Aside from the detailed results of this study recorded in the preceding chapters, it seems pertinent to gather together here

[1] See page 66.

some of the larger and wider aspects of the method used and of the results obtained.

The validity of the application of such a statistical method as that employed cannot, I believe, be questioned. The study of the financial statistics of education, through the medium of large groups of cities needs no further justification, if such statistics are to be raised above the plane of mere *one to one* comparison of cities and are to be utilized for general scientific conclusions.

The study of the expenditures for public education with reference to the expenditures for other municipal activities should be extended until the relationships between all of these different expenditures can be defined and their meaning fully understood. As cities increase in size, and the extent, number, and importance of municipal functions increase, thus bringing a greater burden to the sources of the municipal income, there will develop a greater necessity for a knowledge and understanding of these relations, both for a fuller recognition of the essential conditions of municipal life and for a better comprehension of the legitimate claims of public education for a more generous support.

The finances of public education in a municipality cannot be studied apart from the finances of other activities any more than the public school as an institution can be studied in isolation from its social environment. The wider consideration of this important matter will lead to two much-desired results.

First, there would be a tendency toward the breaking down of that social and administrative isolation of the public schools which now obtains in so many communities. The idea of the unity of the municipal life and institutions brought forward in the introduction of this study will be furthered only when the mutual dependence of the social activities within that life is realized. Without doubt there is a grave danger in not having the public schools of all cities safeguarded against the attacks of vicious politics and self-seeking prejudices. But politics and prejudices of this sort exist in a greater or less degree in every community. Merely to keep the public schools free from their influence is not to protect the remaining elements of the municipal life. Each of these elements possesses a potential power for education. Each should be entitled only to such proportion

of the public revenue as is demonstrated by its efficiency and importance within the municipal economy.

Second, there would result a broader conception of the economic importance of education, which would serve to supplement a rational treatment of those fundamental and far-reaching problems of financial support at present confronting the educational activities in most American cities. The fiscal relationships that have been pointed out are of the variety demanded for a correct discrimination of the rightful quantity of public support to which each of the municipal activities is economically entitled.

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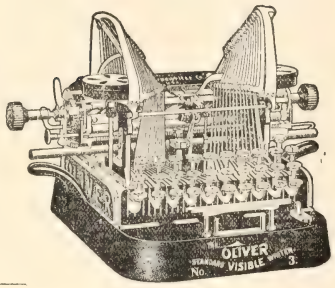

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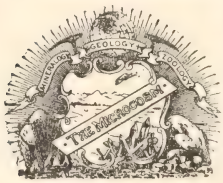

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